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GASTROJEJUNAL ULCERS (PSEUDOJEJUNAL ULCERS)

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THE writer has made an investigation of all the cases in which gastrojejunostomy has been done in St. Mary's Hospital, Rochester, Minnesota, to ascertain, if possible, if jejunal ulcer has occurred as a secondary condition.

The total number of operations performed upon the stomach and duodenum up to December 31, 1909 (C. H. and W. J. Mayo), was 1,775. Of these 1,141 were gastrojejunostomies. In 715 cases the operation was for duodenal and gastric ulcer, in 167 cases for cancerous obstruction at the pylorus, and 259 were in connection with partial gastrectomy. The large majority of the latter operations were for malignant disease.

Of the whole number, as far as any knowledge could be obtained, not a single case developed true jejunal ulcer; nor have any such cases come to our clinic in which gastrojejunostomy had been performed by other surgeons.

It must be admitted that we might not have recognized a jejunal ulcer had we encountered one, and it is possible that some of the cases in which symptoms continued after operation were due to an undiagnosed jejunal ulcer. It is also possible that some of our patients may have fallen into the hands of other surgeons who have found and operated upon them for this secondary condition.

Acid gastric secretions when diverted into the jejunum (in connection with lowered local resistance) are undoubtedly the active causes of peptic ulcer, but we should remember that the jejunum is continuously bathed in the alkaline pancreatic and biliary secretions, and that the jejunum is, therefore, much better protected than the stomach and upper duodenum where peptic ulcer ordinarily appears.

Herbert J. Paterson (Annals of Surgery, August, 1909) has made a most important contribution to the subject of jejunal ulcer. He tabulates in detail the fifty-two cases recorded, reporting one typical case of his own. Mr. Paterson points out, however, that "nearly one-third of the reported jejunal ulcers involve both the stomach and jejunum." They were found in the line of anastomosis and were, therefore, gastrojejunal, although originally classed as jejunal ulcers. He says: "Jejunal ulcers are the result of altered physiological conditions produced by operation; gastrojejunal ulcers are probably a direct consequence of operation." I quite agree with Mr. Paterson that the latter cases should not, without qualification, be grouped with jejunal ulcers, but should be classified separately as "gastrojejunal ulcers." I believe that we should view most gastrojejunal ulcers as due to technical failures in the operation itself rather than an unavoidable condition which, up to the present time, true jejunal ulcer appears to be.

We have had three cases corresponding to the gastrojejunal or pseudojejunal type of ulcer. A brief report of them is herewith appended.

CASE 1. St. Mary's Hospital records. May 5, 1899. *Gastrojejunal ulcer, result of impacted button.* Female, aged 38. Married eleven years. Three children, youngest four years. Menses absent for seven months. Has lost over twenty pounds in weight. History for several years of "spells of stomach trouble" in periods lasting from a few days to a few weeks and marked by acid eructations and a burning feeling when the stomach is empty, especially several hours after taking food. Vomiting frequent for the past two years, and for several months the act has been induced once or twice a day to empty the stomach of its contents. The vomitus contains much partially digested food; no blood.

Present condition. Emaciated woman presenting no evidences of disease outside of the stomach. The stomach greatly dilated and somewhat prolapsed, its lower border extending downward nearly to the pelvic brim. The content of the stomach was withdrawn with a tube and contained a great quantity of fermenting food stuff with a musty odor.

Diagnosis. Pyloric obstruction. Operation May 7, 1899. A calloused ulcer was found obliterating the pylorus and reducing its caliber to about that of a lead pencil. Anterior gastrojejunostomy with the Murphy button was performed, Button not passed.

Subsequent history. Patient gained over thirty pounds in weight; felt quite well and was able to attend to her household duties until three years and nine months after operation when she had a sudden attack of abdominal distress supposed to be appendicitis. This was at once followed by symptoms of obstruction and constant interference with the progress of food from the stomach. A tender mass was palpated just to the right of the umbilicus. Operation April 2, 1902. A mass of adhesions attached to the abdominal wall was encountered about an ulcer which had perforated the stomach immediately above and to the right of the original gastrojejunostomy opening. The ulceration began at the site of the stoma, the jejunal mucous membrane forming the lower border of the ulceration. The button was found in the stomach somewhat corroded. When passed downward into the site of the gastrojejunostomy, the button was seen to fit closely into the site of the ulcer. Evidently the acute symptoms were due to the button dropping into the opening, producing obstruction and a pressure ulcer. It was noted during the operation that the button became dislodged with the manipulations. The ulcer was excised and a large plastic gastrojejunostomy done over a Robson bone bobbin. The patient recovered and has remained well.

CASE 2. St. Mary's Hospital records. January 22, 1904. *Gastrojejunal ulcer the result of retention of injected suture material.* Male, aged 54. Came for examination seven months subsequent to a gastrojejunostomy performed by a competent general surgeon in a distant city. History for past twenty-four years. Dyspeptic; better and worse by spells but gradually losing ground. Gas eructations, burning distress in the stomach eased by taking food, alkalies, or diluants. Gastrojejunostomy seven months ago which gave temporary relief but was followed by more pain and tenderness and occasionally bile vomiting. Pain different in character and seemingly located to the left of umbilicus. Cicatrix of former operation in midline between umbilicus and ensiform cartilage. Stomach splashy, prolapsed but evidently protected by the abdominal muscles against sudden motion. Acids normal, but some food remnants found in gastric contents after five and one-half hours. Small quantity of bile present. Operation January 28, 1904. Incision two inches to the left of the midline. Dense adhesions encountered. Site of gastrojejunostomy exposed; a posterior operation on a nine inch loop. On the anterior margin of the gastrojejunostomy a thickened spot was discovered covered by recent adhesions and having the appearance of a perforation, evidently the cause of the general abdominal adhesions previously encountered. The stomach was opened just above this point close to the line of the gastrojejunal union, exposing an ulcer with a thickened base in the line of union. The ulcer was about one cm. in diameter and undermined at the inner side. The floor of the ulcer was hard and smooth, but just at the point of undermining a projection was seen which proved to be a silk suture in communication with the gastrointestinal cavity. The suture was removed, the ulcer excised, and a large plastic gastrojejunostomy done at the site of the opening. A suture enteroanastomosis between the limbs of the jejunum was then done and the pyloric ring excised, the stomach and duodenal ends turned in. The patient made a rapid recovery and when last heard from two years after the operation, was in good health.

CASE 3. St. Mary's Hospital records. March 10, 1907. *Gastrojejunal ulcer, the result of infected hæmatoma in the suture line.* Male, aged 34. Fourteen years ago began to have "spells" of stomach trouble, pain, gas, sour eructations, heartburn two to six hours after meals, eased by taking food. No vomiting. A year ago he became much worse. Epigastric tenderness and attacks of severe pain at irregular intervals radiating to the right. In May, 1906, an exploratory operation for gall stones was done by his home physicians; no stones found. Has been taking morphia daily for more than a year. Lost forty pounds in weight.

Physical examination. Emaciation marked. Urine contained small amount of albumen and a few casts. Except for stomach symptoms, patient normal. Stomach moderately dilated. Test meal shows total acidity 94; hydrochloric 70; combined 20.

Diagnosis. Duodenal ulcer. Operation March 18, 1907. Large duodenal ulcer; subacute perforating, protected by adhesions. Posterior no-loop gastrojejunostomy. A small hæmatoma was formed by the accidental pricking of a vein in the transverse mesocolon, necessitating supplemental sutures. Patient made a good recovery, gained 39 pounds in weight and stopped morphine. Re-examination November 24, 1909. For more than a year following the gastrojejunostomy had had no further trouble except for some localized soreness to the left of the umbilicus.

About three months ago this tenderness increased and was accompanied by many of the former symptoms though less in degree. No vomiting, but constant pain. Test meal shows total acidity 84; hydrochloric 70; combined 14. Urine specific gravity 1,028. Acid. Hæmoglobin 86 per cent.

Operation December 4, 1909. An ulcer was found in the line of the gastrojejunostomy opening about one and one-half cm. in diameter, extending into the fatty tissue of the mesocolon at the point of the former hæmatoma. The ulcer base was hard and smooth, composed of fibrous tissue and fat. The whole of the gastrojejunostomy opening, together with the ulcer, was excised and the stomach and jejunal openings completely closed. A large Finney gastroduodenostomy was done at the site of the original duodenal ulcer which had healed and contracted down. Examination of the excised gastrojejunal ulcer showed it to be a cavity in the fatty tissue and not containing in its floor either stomach or intestinal tissue. (Fig. 1.)

EXCISION OF THE FAT OF THE ABDOMINAL WALL—LIPECTOMY

By HOWARD A. KELLY, M. D., Baltimore, Maryland

TO be a storehouse for useless adipose tissue and to carry this handicap around openly displayed wherever one goes is one of the most distressing of life's minor ailments.

An unsightly, gross exaggeration of the normally graceful outlines of the human figure, oftenest by a perverse fate, affects the beautiful figure of woman designed by nature to be the expression of her supreme effort in the realization of perfect, concrete beauty of form. Excess of fat may be universally distributed, as in the case of the celebrated Daniel Lambert and the "fat ladies" at traveling shows, or oftener show a tendency to abdominal localization, in or under its walls, in its omentum, or packed about the viscera.

Fat shows strange freaks in this way, for which physiology as yet offers no adequate explanation. The large, localized pendulous accumulations about the back or buttocks form the ordinary lipoma so long familiar in medical literature, and the joy of the younger surgeon, while the extraordinary periodical accumulations in the buttocks of the Bosjesmen (steatopygia) are as clearly physiological as the great nutritious butter-tails of the African sheep.

The most frequent place for accumulation of a huge roll of fat in women taking on adipose near the change of life, is in a great transverse roll which hangs across the lower abdomen below the umbilicus, forming a crease, often madid and eczematous just above the symphysis.

Fig. 1. Shows case of fat, pendulous abdomen. The abdomen hangs within two inches of the knees. Patient's weight 285 pounds.

The unwieldy pendant mass of fat in this position is peculiarly distressing to the woman. Is it a disease? What else? I think it is only because the condition has been looked upon as natural as well as inevitable and irremediable that it has as yet received so little attention.

A woman who is hampered with this bolster or hammock laden with fat is always unwieldy in appearance, protuberant and wan-

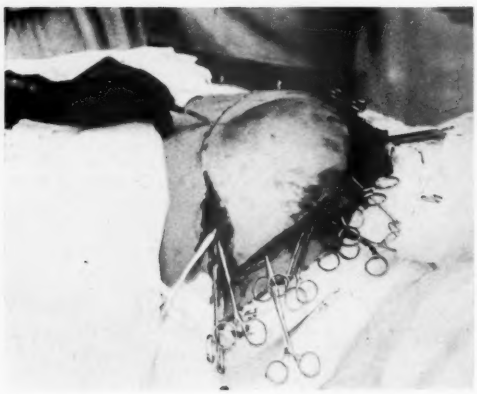

Fig. 2. Shows outline of skin and partial removal.

Fig. 3. Shows fat removed and the upper and lower flap of the abdomen being approximated.

dling in gait, awkwardly balanced, and as a rule short of breath. She is incommoded in dressing and hampered in caring for her person. She finds the toilet of the lower part of her person distressingly difficult, and in the more marked cases she has not been able to see her lower abdomen or her thighs for years.

Ten years ago I operated on a monstrous abdominal wall (see Johns Hopkins Hospital Bulletin, Oct., 1899), taking off from it a wedge of fat and skin extending from one flank across into the other, down to the deep fascia, much as one would cut a huge slice lengthwise out of a watermelon. The mass was so long that as I held one end up high in my hands at breast level, the other end dragged on the floor, and it was so heavy that it was difficult to keep my hold. The patient, who had diabetes, recovered from the operation, and was vastly relieved in every way by the loss of the pendulous abdomen and with it the disappearance of her hippopotomal appearance. In place of the unwieldy, flabby, overhanging mass, she had from the time of the operation a flat "straight front" abdomen with a long, linear scar from side to side, and looked as though some surgeon tried to saw her in half and had stopped when he got two-thirds of the way through. When the fat patient, as is often the case, has an umbilical hernia, the wide excision of the fat may be made to include this, facilitating the hernial operation by laying bare the deep fascia which is to be loosened from one semilunar line to the other and overlapped to cure the hernia.

It is easy to see how much tissue ought to be removed by pulling the mass up and away from the body. An incision above and below on the pendulous mass made a little above the lines of deflection will remove enough and yet leave enough skin for approximation.

With a little practice the surgeon will be able to decide this with his eye as the patient lies on her back on the table, or if he is uncertain he may cut across the abdomen below from side to side and then cautiously carry the upper incision from side to side, measuring with the eye and testing the mobility of the tissues above to see that they will slide down to meet the lower flap. This dissection can be made very rapidly. All hæmorrhage must be checked; deep vessels must be caught as they come out of the fascia and ligated with catgut. The incision must be carefully covered with hot gauzes while operating, and the incision sloped a little inwards so that apposition will be perfect.

All vessels are tied with fine catgut; the fat sewn together with catgut and the skin with silkworm gut and horsehair. At either end of the incision a small cigarette drain of rubber protective tissue is inserted. The dressing is with silver foil and sterile gauze.

These wounds, in spite of their immense size, heal promptly, and there is practically no post-operative discomfort. I sometimes,

Fig. 4. Shows abdomen sutured after removal of fat. The gauze drain in angle is clearly visible.

Fig. 5. Shows appearance of patient after operation.

after getting a patient up in two weeks, require them to wear a bandage for several weeks more.

The results of such an operation are: The removal of a large slab of fat and a decrease in weight. Great addition to personal comfort generally. Convenience and comfort in dressing. Better pose in standing and better poise in walking. Increased activity. Cleanliness greatly facilitated. Figure changed from unsightly and awkward to one much more natural. The sensitive patient occupying afterwards a more normal and natural relation to society.

All these factors in her favor may in some cases serve to bring about such a change in enjoyment and activity of life that the patient seems rejuvenated. Quite apart, however, from the tremendous physical and, in some cases psychical benefit, I personally recommend and would do the operation in extreme cases for the cosmetic effect.

Since my original publication I can find no other reference in the literature to this subject except that of Weinhold in the Central. f. Gyn. No. 38, Sept. 18, 1909, p. 1332. He reports operating on a patient with enormously fat abdomen and an umbilical hernia. He goes extensively into the questions of plastic operations on the abdominal walls in conjunction with abdominal operations. His technique differs radically from mine. I find nowhere a deliberate operation for fat alone. Since my original case, I have had seven others, three in association with umbilical hernias, four alone. All cases have been immensely relieved.

INFLAMMATORY TUMORS OF THE SIGMOID

By MAX W. MYER, M. D., St. Louis, Missouri

WE frequently encounter in the surgery of the gastro-intestinal tract inflammatory tumors, which even upon inspection cannot be differentiated from malignant growths. This condition is especially frequent in dealing with lesions of the stomach. Similar inflammatory tumors are observed in the small and large bowel and offer even greater difficulties in their recognition and differentiation. The sigmoid seems comparatively free of this type of growth and it is the rarity of the condition, together with the difficulties which it offers, which warrants the reporting of this case.

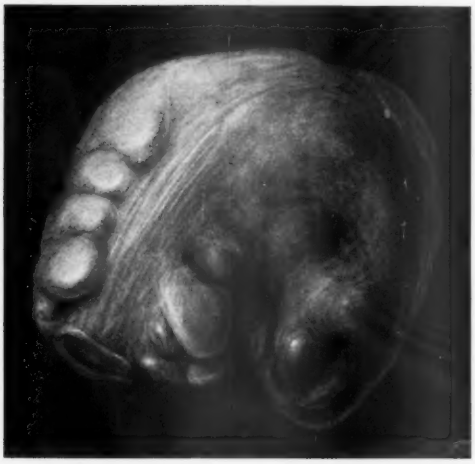

Fig. 1. Tumor of sigmoid.

Tumors secondary to carcinoma of the sigmoid and those diffuse tumors secondary to diverticulitis are not included in this report. Neither are those inflammatory masses produced by mesosigmoiditis nor those secondary to specific infection to be discussed. The type of tumor which is here described is the primary, circumscript, inflammatory tumor of the sigmoid, benign in its pathological findings, but demanding as a rule radical treatment on account of the group of symptoms which develop.

Mrs. B., age 50 years, was admitted to the Parker Memorial Hospital at Columbia, Mo., on August 4, 1908, on account of a profuse vaginal hæmorrhage and purulent discharge, which had existed for several months.

The family history did not offer anything of interest.

The personal history was negative, except for a spell of typhoid twenty years ago.

The patient had five children, two of whom are living and healthy. The menstrual life was normal, the menopause having been reached at 43 years.

About five years ago, the patient complained of severe pain in the left inguinal region. For this trouble she claimed to have undergone an operation four years ago. The nature of this operation was not known to the patient and no scar could be found. Since April last, she had had a great deal of pain in the left side and had noticed a bloody discharge from the vagina. These symptoms had grown constantly worse. In the past month she had suffered from very severe constipation. At times the passing of gas and the stools were very painful. There had been a marked loss of weight in recent months and a daily loss of strength. The patient was very anæmic and somewhat cachectic, although she still had a very heavy fat polster.

The thorax and abdomen were negative. Vaginal examination revealed an atrophic vagina. A thin, watery, hæmorrhagic discharge with a very foul odor escaped from the vagina upon inserting the examining finger. The vaginal portion of the cervix was normal. The body of the uterus was retroflexed, large and of irregular contour. This entire mass was very sensitive to pressure and fixed in the hollow of the sacrum. The mass extended much farther to the left than right side, but could not be definitely outlined.

Upon introducing a sound into the cervical canal a very profuse hæmorrhage appeared. Curette removed a small mass of tissue, which the microscopic examination demonstrated to be carcinoma.

By rectal examination the mass could be much better palpated, and seemed firmly fixed. It extended to the left pelvic wall. No relation with the bowel could be detected by digital examination.

Diagnosis. Carcinoma of the cervical canal. Inflammatory involvement of the adnexa, with adhesions to the neighboring viscera.

Operation. Median incision, five inch fat polster and very heavy omentum. A bilateral hydrosalpinx with firm adhesions was encountered. At one point the small bowel was firmly attached and its walls somewhat thickened by inflammatory infiltration. The uterus was firmly fixed in the hollow of the sacrum. A Wertheim operation was done with great difficulty on account of the adhesions and the infiltration of the paramétrium on both sides. Some hæmorrhage. After the removal of the uterus and appendages a mass about the size of a fist was detected in the sigmoid. This was regarded as malignant and was treated according to Mickulicz — the bowel being resected after forty-eight hours.

After a rather stormy twenty-four hours, the patient's condition improved and was satisfactory up to the sixth day, when she developed symptoms of peri-

Fig. 2. Cross-section of tumor mass.

tonitis and died on the eighth day. Autopsy was not permitted.

The uterine tumor was a typical carcinoma of the cervical canal, with marked infiltration of the parametrium.

Description of tumor of the sigmoid. The tumor mass the size of a fist has developed from the sigmoid (Fig. 1). It is of a rather hard elastic consistency. Several small epiploica are present. The surface shows a large increase in tissue, which can macroscopically be recognized as fat tissue. The normal bowel surface shows in only a very small area, the remainder being completely covered by the hypertrophic fat tissue. The greatest increase of tissue is on the mesenteric border.

Cross section shows the lumen of the bowel, very markedly constricted (Fig. 2). The different layers of the bowel can be readily recognized microscopically and are appreciably increased in thickness. In great part the entire bowel is surrounded by the hypertrophic tissue and especially noticeable is the increase on the mesenteric side. At several points on section, the epiploica seem to have taken active part in the process.

Microscopic examination. Sections were taken from the entire cut surface of the tumor. The mucous membrane appears normal throughout the entire lumen of the bowel. The glands are normal and do not penetrate the submucosa or muscularis at any point. The submucosa is markedly thickened, in great part due to œdema, but also some tissue increase. The muscularis is not appreciably thickened. The inner circular layer appears perfectly normal, while the outer longitudinal layer is here and there separated into bundles by the infiltrating fat tissue.

The connective tissue and fat tissue, which form the greater part of the tumor, have developed between the muscularis and the peritoneal covering of the bowel. On the outer surface of the tumor, the peritoneal layer is distinctly seen and shows a thickening due to an excessive inflammatory reaction. The connective tissue in great part does not show an excessive cellular development or vascularity, but seems to form merely a frame work for the very excessive fat development. At several points, however, a very active round cell infiltration is present. This seems to correspond to an area in the middle of the tumor mass. Several lymph nodes, showing an increased inflammatory reaction, are seen in the area corresponding to the thickening in the region of the mesentery. Neither necrosis nor degeneration are present. At no point is the slightest suspicion of malignancy encountered.

Only a few cases of this inflammatory type of tumor have been reported. Braun in a recent article reports such a case, together with inflammatory tumors of the other parts of the intestinal tract. Moynihan and Mayo Robson have both encountered such conditions and special emphasis is made by them of the difficulties in recognizing these growths. Monserrat has had opportunity to observe two cases. In the discussion of diverticulitis by Mayo and Giffin, one of the cases reported may possibly belong to this class. A careful search of the literature would no doubt reveal other cases, which a strict interpretation would place in this group.

The etiology is not always clear. The inflammatory process involves chiefly the connective tissue and fat layers, — at least in those tumors of the large bowel. The source of infection is manifold — coming either from within the lumen of the bowel or from without. Stagnation of fæces must be a frequent etiological factor, but adhesions to the neighboring viscera cannot be disregarded. It is possible that in the case reported the process in the adnexa was the original source of infection. A number of writers have attempted to establish a direct relation through the blood and lymph supply of the female genitals and the sigmoid. Such a relation is not necessary to explain this type of tumor. The presence of the uterine tumor in this case, however, influenced to a great degree the ready acceptance of the diagnosis of carcinoma of the sigmoid. Giffin has made the observation that diverticulitis of the sigmoid is found chiefly in the very fat. This should also be kept in mind in the consideration of the etiology of this inflammatory type.

It will not be possible to diagnose these tumors until a definite symptom-complex has been determined. Practically all tumors of this class which have been reported have been resected with a diagnosis of malignancy and the error recognized only after a careful microscopic examination. This may account for some of the good results in the reported cases of carcinoma of the sigmoid and especially those in which a permanent recovery is reported after a simple colostomy.

We are not accustomed in this class of tumor to find blood and pus present in the stools, at least not in those cases uncomplicated by ulceration. Naturally the presence of blood due to fissures and hæmorrhoids must be excluded. The obstructive symptoms develop slowly and after the patient has had an acute attack with the usual symptoms of a mild peritonitis in the left inguinal region, the process may clear up entirely to return again

with an exactly similar attack. In malignancy the obstructive symptoms are present more or less constantly after they once develop, and we do not have the periods of comparative freedom from symptoms. This is to be explained by the different causes of the obstructions, the malignant type being due to the obstruction from the tumor mass itself, while in the inflammatory an acute swelling causes the temporary closure. The length of time which such a group of symptoms has existed must be an important factor in the diagnosis. One must not be unmindful, however, of the fact that malignant tumors of this region are slow in development. Braun claims that cachexia may develop even in these inflammatory tumors, when the obstruction has been severe enough and of a sufficiently long duration to permit absorption of the toxins. The physical examination will sometimes reveal a small tumor mass in the region of the sigmoid. These are as a rule movable and cause very little if any pain upon manipulation. The inflammatory tumor is usually smaller than the malignant one, especially in the latter stages when a threatening perforation exists and the so-called conglomerate tumor develops, due to the formation of protective adhesions by the omentum.

In the female the tumor can sometimes be palpated vaginally in the posterior fornix and especially is this true of the malignant tumor.

The rectal examination is usually negative. The sigmoidoscope might be of advantage in some cases in making a differential diagnosis.

It has been impossible in the discussion of the symptoms of this tumor, not to deal with the differential diagnosis. Carcinoma of the sigmoid offers the greatest difficulty and will in most cases defy differentiation. Chronic diverticulitis with its group of symptoms, similar in great part to the inflammatory type, will also offer difficulties. The diverticulitis occurs, however, with far greater frequency. Spastic sigmoid and mesosigmoiditis must also be kept in mind. Differentiation from tumors of the genital tract in the female will also warrant consideration. This offers more difficulties in carcinoma than in the type of case reported. Bonney reports five cases in which a diagnosis of tumors of the genitals was made and at operation the sigmoid was the part involved. The writer has encountered such a case in which a diagnosis of an infected ovarian cyst was made, and at operation a carcinomatous ulcer of the sigmoid with perforation and development of an intra-abdominal abscess was found. The patient has remained well for over three years, following resection of the bowel and drainage.

The prognosis in the inflammatory type is good. They rarely grow to be much larger than the fist, for by this time, they have usually caused obstructive symptoms and demand treatment.

They do not tend to perforate forming an intraperitoneal abscess. Braun reports two cases in which he claims the tumor disappeared without operative treatment. Spastic sigmoid must be carefully differentiated before such cases are reported. Colostomy with rest has undoubtedly caused the disappearance of some of these tumors. Resection of the tumor will usually insure a cure, but Braun reports one case in which he had to do a second resection and found a tumor similar in every detail to the one removed at the first operation.

The treatment of these cases must remain operative unless a sufficiently definite group of symptoms can be developed by which a differential diagnosis from malignancy can be made. Palliative treatment is not indicated on account of losing valuable time, should the tumor prove to be a malignant one. Resection always becomes necessary after obstructive symptoms develop. Primary resection with end to end or lateral anastomosis is the operation of choice, unless an acute obstruction makes such a resection dangerous or impossible. In such cases the Mickulicz operation is indicated. In the case reported this operation was done because the patient was not in a condition to withstand a resection after the Wertheim operation. Temporary colostomy having as its ultimate aim the disappearance of the tumor would hardly be justifiable even though a positive diagnosis of a circumscript inflammatory tumor could be made.

CIRCUMSCRIBED SEROUS MENINGITIS OF THE CORD[1]

By JOHN C. MUNRO, M. D.
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AN interesting paper on this subject, by Spiller, that appeared in the American Journal of the Medical Sciences for January, 1909, explained a condition which I had observed a number of times at operation, and for which I had previously obtained no satisfactory explanation. At the time of my earlier cases (1897) I reported the findings to pathologists, who not only gave me no light on the subject but even questioned the existence of the lesion. In a small collection of cases of laminectomy, reported at the American Medical Association in 1904, I called attention to one with syringomyelia and to another diagnosticated as subacute fracture dislocation, in which I found a "collection of clear fluid under a distinct arachnoid membrane" in which "the removal of this fluid produced marked amelioration in the pressure symptoms." This phenomenon and the relief that followed the removal of a soft extradural myeloma in another case led me to say that "there is a something that produces grave paralysis that is demonstrated clinically, which appears totally inadequate and for which we have no corresponding experimental nor post-mortem explanation."

That the lesion had been observed by Krause and a few others was unknown to me at the time. A clinical lecture by Horsley, appearing soon after Spiller's paper, has stimulated me to report my own cases in detail and to examine the scant literature upon the subject in the hope of arousing surgical interest in a class of patients that otherwise would be condemned to a slow, inevitable, and distressing death.

Von Bruns, in 1908, said that "in more recent times operation has shown that there is a form of disease difficult of interpretation but which can mimic in a most classical manner tumors of the dura: a meningitis serosa circumscripta." In February, 1909, in a most valuable clinical lecture published in the British Medical Journal, based on an experience with twenty-one cases of this type — valuable because it gives general conclusions founded on a broad experience and because it is not a tedious analysis of cases — Horsley says that "many cases of so-called acute myelitis are meningeal in origin and a laminectomy may arrest the whole process and later injury to the cord."

The disease, when it comes to operation, is almost invariably considered to be tumor. At present there seems to be no sharp line in diagnosis between the various types of subdural lesions, but greater familiarity with the signs and symptoms of serous meningitis will probably enable the diagnostician to detect it with reasonable accuracy.

No writer has reported a large experience with this form of lesion. As mentioned above, Horsley has seen twenty-one cases, Krause, in 1907, reported six out of twenty-two operations for supposed tumor. Other writers (Oppenheim, v. Bruns, Mendel and Adler, de Montet, etc.) report one or two cases each.

The lesion is found more frequently in the middle decades of life. Horsley had one patient under the age of puberty, v. Bruns one sixteen years old, and my youngest patient was fourteen. Horsley's oldest patient was sixty.

The earliest mention of this type of disease that I have found is by Schlesinger, who reported in 1898 a case of hydrops meningeus dying from intercurrent disease, in which he found an intradural cyst adherent to the dura and compressing the cord. The symptoms were typical as we know them now. Undoubtedly other cases had been reported earlier than Schlesinger's but the important point is that the significance of the lesion was not properly recognized until about 1900, by Horsley, Krause, and a few others.

The case reported in 1903 by Spiller, Musser, and Martin is the first one mentioned in American literature so far as I can discover.

The pathology has been demonstrated better

[1] Read at the Meeting of the Southern Surgical and Gynecological Association, December 15, 1909.

in the living than in the dead. But few autopsies are recorded and then rarely in connection with the symptoms. Schmorl demonstrated a middorsal cyst removed post-mortem, full of fluid and compressing the cord. Of two fatal cases mentioned by Horsley in neither were the nerve roots much affected, "so that it is easy to understand that there may be independent paraplegia and yet no absolute anæsthesia anywhere." One of his cases died of cardiac syphilis and the other, unoperated, died of a meningo-gliosis(sclerosis).

In typical cases one finds at operation a tense dura, probably not pulsating. When this is opened a small quantity of cerebrospinal fluid escapes under slight pressure, while immediately the dural slit is filled by a thin, more or less opaque pial membrane that bulges forth under tension of the contained fluid. This fluid is clear and spurts forth as soon as the membrane is opened, when the latter flaps back and forth as a definite curtain, attached to the dura and cord and more or less to the nerve roots. This membrane can be dissected out in great part, as in one of my cases, or it may be removed intact without being opened, as in Schmidt's case, when it appeared as a sausage-shaped cyst $7\frac{1}{2}$ by $1\frac{1}{2}$ cm., with blunt boss-like projections. The wall in his case was found to consist of dense connective tissue lined on the inner surface with a single layer of flattened epithelium. The membrane has been described as similar to the loose subcutaneous tissue that forms in Schleich's infiltration anæsthesia, a "milk-like opacity," as it were.

In a few reported cases this definite membrane formation has not existed as such or else has been overlooked. In all of my cases it was distinctively present. When not reported or not identified there seems to be a localized collection of fluid under abnormal pressure. De Montet examined the fluid and found only lymphocytes and leucocytes and some large mononuclear cells like large phagocytes. He found no plasma cells nor bacteria. The cerebrospinal fluid drawn by lumbar puncture from case 1 of my series was sterile.

The extent of adhesions apparently varies and it is not always clear why the fluid tension should be so localized. In some cases a probe can be passed beneath the pia in one direction without obstruction, while in the opposite direction it is blocked by light adhesions. In other instances a true cyst is found. The cord is reported as flattened in some while in others it is not obviously narrowed.

No causation, definite and common to all cases is known. A case reported by Oppenheim and operated upon by Lexer and one of v. Bruns' cases was secondary possibly to a spinal caries. Mendel and Adler's patient had well marked apical tuberculosis. Syphilis has been present in several cases, including one and possibly two of my own. In this respect it is important to bear in mind that in no case of this sort has anti-syphilitic treatment been of any value; rather has it been harmful. In the post-mortem examination of a syphilitic case by Schwartz there was found diffuse cervical and dorsal meningitis with adhesions of the dura, degeneration of the cord, and destruction of the posterior roots. The anterior columns were compressed by a meningeal cyst. In the anterior horns were cavities without gliosis.

Ströbe showed a post-mortem specimen of serous meningitis in a case dying of chronic leptomeningitis. He suggests some inflammation in the cord, meninges or bony spine, or a gliosis as a cause. Furthermore, an extensive degeneration of the columns or a syphilitic meningitis may serve as a primary cause. At the autopsy of my case dying of operative septic meningitis no primary cause could be found for the serous meningitis.

In several cases, among them that of v. Bruns, no local or general cause could be demonstrated; Schlesinger found a serous cyst in a case dying of multiple cerebrospinal sclerosis, and the lesion has been found in a patient dying of typhus (spotted fever).

Krause has reported at great length a case following gunshot wound of the spine, with subsequent necrosis and abscess. Unfortunately he did not open the dura sufficiently to demonstrate the pial membrane and the case, in spite of his findings, is not thoroughly convincing. To be sure, he punctured the very thick opaque dura, evacuating clear fluid under abnormal pressure, but relief to symptoms had already followed evacuation of an epidural

abscess, much as I have seen follow the evacuation of a soft myeloma pressing or rather resting on the outer surface of the dura. On the other hand, a strong argument that a neighboring infection may act as a cause is seen in the localized serous cerebral meningitis secondary to middle ear infection (Quincke) and which clears up as soon as the primary cause is eliminated.

Serous meningitis may be found in glioma and syringomyelia whatever the interrelation of the two conditions may be.

Horsley speaks of influenza as a cause, and de Montet's case followed a bad cold (coryza). The former also mentions the fact that a gonorrhœa occurred relatively near the onset of symptoms in some of his cases.

That trauma, with and without serious damage to the cord, may be an exciting cause is shown in Bliss' case and in two of my cases. Oppenheim says, however, that serous meningitis of this type is not a sequela to concussion or to railway spine.

Joachim believes that the condition may be primary in the pia, as shown in a post-mortem examination where there was thickening of the pia and of the dura, the latter apparently being secondary. Krause maintains that "disease of the arachnoid leads not only to the formation of adhesions and increased exudation, but the power of absorption at the diseased area, if not wholly impaired, is at least diminished."

Finally, whatever the cause or causes may be, it is important for us to remember that conditions of this sort do exist; that they closely imitate the conditions produced by tumor and that the outlook under early surgical interference is good, while the outlook under a policy of non-interference is fatal.

The results from operation, where no grave primary lesion exists, are very good. Improvement may be relatively rapid or quite slow, according to the duration of the lesion and the extent of the damage inflicted upon the cord and nerve roots. Recovery may be aided by electricity, massage, and passive motion, as emphatically demonstrated in one of my cases. Spiller, Musser, and Martin's case was well in two months after operation, Mendel and Adler's in five months, while a case of v. Bruns, with returning function two weeks from operation, required twenty months to bring about recovery that was almost complete.

Oppenheim reports a case dying on the table from the shock of a long operation, and one of my cases died within a few days from operative septic meningitis.

A patient of Horsley's, operated upon in 1899, is well now. My cases operated upon in 1902 and 1906, both without attendant deep lesion of the cord, are well at the present time.

With recovery certain minor symptoms or signs may persist without impairing the patient's usefulness. Such are localized atrophies, increased reflexes, lack of complete joint extension, etc.

There seems to be but little reaction from operation in the average case. Spiller, Musser, and Martin's case exhibited clonic spasms upon evacuation of the subpial fluid. A similar phenomenon I have not seen reported elsewhere, nor have I encountered it in any of my own spinal work. All authorities agree that spontaneous recovery does not take place, and Horsley is convinced that he has not infrequently found a localized meningitis as the essential if not the sole cause of the paralytic symptoms.

A sufficient number of cases have not been reported to enable me to venture upon the question of differential diagnosis. To quote briefly some neurological authorities will be sufficient here. Oppenheim states that in gliosis we find wanting the cramp-like muscular spasms which are so frequent in tumor, and which appear so early in pressure of the cord. In syringomyelia we look for trophic disturbances in the bones and joints with bowing of the spine and a slow dragging course with remissions. According to Joachim, "decision on the differentiation between tumor and an inflammatory process depends whether we can establish a propagation of the process upwards." Horsley speaks of the unilateral origin in most cases, a condition that must be recognized at the outset.

It will be well to take up the symptoms individually as recorded by the various reporters.

Pain. This symptom is practically always present. It may affect the back, the neck, the scapula, or the extremities. It may shoot into

the breasts or may appear lower down in the trunk as a typical girdle pain. All patients, however, do not complain of the latter, and exceptionally when present it will be increased on coughing or be relieved on change of position. Pain often starts and is treated as a lumbago. One patient complained of unilateral pain in the penis and scrotum at coitus.

When in the extremities it is described as tearing, burning, or crawling, and, according to Horsley, it is in the limb-substance itself. One of my cases described his sensations as though his thighs were immersed in boiling oil.

Horsley calls attention to the diffuse area of pain as an important diagnostic guide, the pain area in tumor being referred rather to one nerve root.

Paralysis and paresis. Paralysis often begins as a weakness of the lower extremities, or a weakness and stiffness that is unequal on the two sides. Some patients, with scarcely any premonitory symptoms, suddenly fall down while walking or rising from a chair, and from that time become more or less paraplegic. Spasticity generally coexists, often appears early, and patients will exhibit a paretic ataxic gait. A light form of unilateral paresis may be found or a paraplegia or paraparesis may be complete, except in one toe or a foot. As in one of my cases, the paralysis may be spastic at one time and flaccid at others.

Incontinence of the urine and fæces, singly or combined, may or may not be present. Loss of power in emptying the bladder or rectum may be due to a paralysis of the abdominal muscles. When the lesion is in the upper spine the upper extremities may suffer more or less paralysis. In my third case the paralysis of the upper extremity was associated with marked atrophy, while a corresponding degree of atrophy did not exist in the paralyzed lower limbs. The dorsal spine seems to be the region most frequently involved, however.

Spasmodic involuntary muscular spasm is frequently seen and it may be worse at night. A spasm may be precipitated by light stroking or rubbing of the skin and sometimes it affects the flexor, sometimes the extensor muscles. In one of my cases the adductor spasm of the thighs was so great that it was almost impossible to separate the knees by main force.

The *reflex phenomena* vary very much in individuals. They may be normal, absent, or generally increased. At times a Babinski will be present on one or both sides, sometimes absent on both sides, or it may fluctuate in the same individual. Patellar clonus may be present on one or both sides while the ankle clonus is absent. In case 1 of my series the ankle clonus was present on one side, slight on the other, while the knee jerks were increased on both sides, while in case 4, in which there was complete anæsthesia, the knee jerks were present but the ankle clonus and plantar reflexes were absent.

In case 6 the knee jerk and the ankle clonus were exaggerated on one side and absent on the opposite side. The Achilles reflex may be absent or present. So with the abdominal reflexes. In short, the presence or absence of the various reflexes varies greatly, judging from the reported cases, and individually the different signs may vary during the progress of the disease.

Sensation. We may find normal sensation; anæsthesia of the involved area; anæsthesia of one area, such as the trunk; and hyperæsthesia of another area, as the lower extremities. Anæsthesia may be present but irregularly distributed on the two sides. Horsley states that anæsthesia may be absolute, always relative, and sometimes only slight, though distributed over a large area. He also points to the parallelism that exists between tactile anæsthesia and the deficiency of the secretory system, shown by administration of pilocarpine.

Patients often complain of numbness as one of the earliest symptoms, appearing about the same time as the initial weakness or paraparesis. Hypalgesia may be followed by hypanæsthesia and thermal hypæsthesia may be found.

A sharply defined border of sensation may change from time to time, and de Montet states that the behavior of sensation at different examinations is possibly characteristic of the disease. "Hyperæsthesia over a large area speaks against tumor where there may be a marked zone at the upper limit of anæsthesia or an area corresponding to the nerve-root or roots on which the tumor is situated." (Horsley.)

Occasionally there is hypersensation in some localized area. Trophic lesions are absent and atrophy may be. Two of my cases with trophic lesions had deep lesions of the cord (glioma or crush).

Myosis, astereognosis, irregular temperature (Schmidt), and coitus without ejaculation are rarely present. Horsley has seen herpes but once. Vasomotor symptoms are absent.

We may find tenderness on pressure over one or more spinous processes, but this tenderness is not increased on motion.

The onset of symptoms may be short or long (three and a half years in Joachim's case and almost nine years in my case 5), and any patient may exhibit an abeyance of symptoms for quite a period.

There is no way to estimate except roughly the time that elapses between the onset of the primary cause and the formation of the pial membrane. In my case of longest onset, nine years, the membrane may have existed from the beginning or it may have formed about two years before operation when the acute symptoms arose. On the other hand, the membrane was definitely formed, at the longest, sixteen days after the causative trauma in case 4, while in case 3 (traumatic) it could have formed nine weeks before operation.

There is no evidence that family history has any bearing on the disease.

Treatment consists in early laminectomy. Nearly every writer condemns lumbar or local puncture as a therapeutic measure or even as an aid to diagnosis except negatively. Early operation would probably relieve most if not all cases suffering from serous meningitis. Mere evacuation of the subpial fluid with or without excision of the pial membrane, with or without drainage, has brought relief in one case or another. Horsley irrigates the canal with bichloride solution, exceptionally using a solution as strong as 1 to 1,000 or 1 to 500. He closes the wound without external drainage and after healing advises mercurial inunction over the wound area as an absorbent. Whether this is always necessary is doubtful; it however can do no harm.

A very brief consideration of my cases is in order before concluding.

Case 1, as autopsy showed, was one of glioma and syringomyelia, there being a dilated central cavity in addition to local lateral cavities in the cord. The abscesses in the cord were evidently secondary to the bed-sores. The latter probably accounted for the chills and irregular temperature. In spite of the fatal central lesions I think it fair to assume that some benefit followed evacuation of the local collection of serum.

Case 2 was clinically diagnosticated as syringomyelia, but in the absence of trophic and joint manifestations I am inclined to the diagnosis of glioma. It is unfortunate that at the second operation I did not open the canal above rather than below the original opening. I believe more relief would have been obtained thereby.

Case 3 demonstrates that a serous meningitis may be secondary to trauma. In view of his recovery, which was complete except for slight atrophy of the forearm, I think it fair to assume that there was no serious cord injury at any time, while case 4 demonstrates that an irreparable crush of the cord may co-exist and will prevent a complete recovery after operation for a serous meningitis.

Case 5 was most unfortunate in every way. Had he not been infected at operation there is every reason to believe that recovery would have been complete. In searching for the origin of this and other cases of infection in our clinic at that time, we found that the 70 per cent alcohol used in disinfecting the operative field and the hands, taken from the original container, gave positive cultures. Since then we have discarded alcohol in our preparations.

Case 6 has been a most satisfactory one when his paralytic condition is considered, but his final recovery must be credited in great part to the tireless after treatment. I could not explain the profuse hæmorrhage that took place at the first operation. No pial nor dural vessels were injured; the hæmorrhage seemed at the time to come as a result of sudden relief of tension, as is occasionally seen in the abdomen and other cavities tensely distended.

CASE 1. Robert McV., 32 years old, entered Dr. G. W. Gay's service at the Boston City Hospital on November 12, 1897. The history is as follows:

Gonorrhœa nine years ago. Denies syphilis. Moderate use of alcohol. Was strong and healthy up to one year ago when he began to have neuralgic pains in

his head and shoulders lasting for ten weeks and then moving downwards to the middle of the back. The pain was constant, but worse at night, sharp and spasmodic at times or dull and aching. He had girdle pain and complained of formication and numbness in his feet and legs. At first he walked with a cane, later with crutches, and finally, two months before entrance, he became bedridden.

For six months there had been dribbling of urine and some fæcal incontinence. At entrance there was no control over bladder or rectum, and the paralysis of the lower limbs was nearly complete.

Dr. W. N. Bullard examined him at this time and made the following notes.

Diminished sensation below the fifth interspace in mammary line reaching back to the sixth on the right and the eighth on the left. Diminished sensation in lower extremities. Subjective numbness in both legs, ankle clonus present on the left, slight on the right, knee jerks increased.

In addition it was noted that there was general weakness of both lower extremities without absolute paralysis except in dorsal flexion of the left foot. No muscular spasm. Slight patellar clonus on right side. Plantar reflexes good; cremasteric reflexes present but diminished. Abdominal and epigastric reflexes absent. Pupils equal and reacting to light and accommodation. Arm reflexes not increased.

Lumbar puncture gave sterile fluid. Smears negative.

A few days later Dr. Bullard made a second examination and reported that the sensation to touch and pain about the level of the fifth ribs on the mammary line and at the sixth dorsal spine was diminished about equally on both sides. This diminution in sensation involved the entire trunk where it was well marked. Sensation reappeared at the right groin and somewhat over the entire right lower extremity though it was probably somewhat diminished in places over the right leg. In the left lower extremity sensation was markedly diminished over the patella and along the crest of the tibia, and apparently somewhat so along the inner surface of the thigh and leg. On the whole it was less good in the left than in the right though over both lower extremities it was apparently delayed and the patient did not always know how to answer.

Operation was arranged for November 29th, but the patient became suddenly ill with chill and high temperature, rapid pulse and vomiting. On November 30th I operated, my notes stating that at the time there was cystitis, bed-sores, and that he had had occasional chills for some time.

Under ether I removed the fourth to seventh dorsal laminæ, inclusive, and opened the dura the entire length of this space. At first there was escape of considerable clear fluid. The dorsal vein of the cord appeared a little more distended than normal. In the lower half of the incision there was a thin, opaque, white film apparently in the pia and slightly adherent to both the cord and to the under surface of the dura. A probe passed in all directions failed to disclose any tumor. The upper three-fourths of the dura was closed with catgut and the external wound closed with silkworm gut, allowing for a temporary rubber tissue drain at the lower angle. The wound was previously flushed out with bichloride solution and salt solution. There was no shock.

December 2. Patient not as well as on first day, both temperature and pulse being elevated.

December 4. Stitch abscess. Stitches removed. Bed-sores over sacrum and left trochanter. Patient feels a puckering sensation in skin of legs below knees. Has gained control of the bladder. Some subjective improvement in motion and sensation of legs.

December 8. Worse. Much pain, requiring morphine. Has chills and most exhausting sweats. Is very weak. Wound looks well.

December 16. Improvement lately. Wound clean.

December 23. Much improved. Has very little pain and can move his toes a little.

January 2. Very comfortable. No pain. Has been on an air bed and the bed-sores are better.

January 12. Chilly sensations with temperature varying from 100° to 105°.

January 20. About the same. After this he rapidly grew worse and died January 29th. At autopsy only the spine was allowed to be opened. Report by Dr. F. B. Mallory. After describing the wound and external parts it says: Spinal canal completely filled by distended dura. On slitting up the dura in situ the cord was found to be enlarged and closely applied to the dura which was adherent to it over the dorsal and lumbar regions. The pia in this part of the cord much thickened, fibrous, and œdematous. The enlargement of the cord began about seven cm. above the cauda equina and extended upwards as far as the cord could be removed in the cervical region. Section of the cord in the cervical region showed two cavities each several cm. in diameter, occupying apparently that part of the cord where the gray matter ordinarily belongs. At the lower end of the cord there seemed to be swelling and œdema around the central canal for an area of 2 or 3 mm. The cord was hardened, and numerous sections were made, the concluding diagnosis being syringomyelia, glioma, and streptoccocic abscess of cord.

Case 2. Charles A. B., astronomer, 27 years old, was seen in consultation with Dr. B. Tenny and Dr. W. N. Bullard on July 29, 1898. Patient first noticed weakness in his lower extremities about two years before the time of my visit. As the weakness increased he was obliged to use crutches, but for the last year paralysis had been nearly complete. He suffered intense pain, describing it as though his thighs were immersed in boiling oil. He had taken morphine regularly for this pain.

Dr. Bullard's notes on examination are as follows: Spinal muscles in lower back tense. The seventh dorsal spine is tender to pressure at times. Knee jerks much increased. Ankle clonus marked on both sides. Paraplegia of both lower extremities, though he can stand with the help of a chair. Sensation to touch and pain is not impaired. Heat and cold not felt well below the level of about the seventh nerve. Galvanic

sensation is diminished at a little higher level (fifth or sixth nerve in front and back). No reaction of flexor cruris to galvanism. All superficial reflexes of abdomen and cremasteric reflex absent. Plantar reflex not tested on account of the spasm.

Diagnosis of tumor of cord in upper dorsal region or of syringomyelia was made.

On August 3d I operated, and found the sixth and seventh dorsal laminæ quite hard and ivory-like, no opening between the two being found. The fourth to seventh laminæ, inclusive, were removed. The dura appeared to be normal and on being opened a normal quantity of serum escaped. Pressing up through the opening was a translucent pial membrane, the pulsation of which and of the cord was less than normal. On opening this sac a large quantity of clear fluid spurted forth under considerable pressure and continued to flow until quite an amount escaped. As the fluid escaped pulsation of the cord returned, and the pial membrane floated back and forth on the wave of serum with respiration. In the pia on the left side were two veins in addition to that on the median line. The cord looked and felt normal. A probe carried upward and downward detected nothing abnormal. Fluid escaped both from the upper and lower ends. There was no evidence of pressure beneath the ankylosed laminæ. The dura was left open and a gauze drain carried outward at the lower angle of the wound, which was closed with silkworm gut.

During the first night the patient was quite uncomfortable, but the pain in the lower extremities, except at the ankle, began to diminish and the spasms began to lessen. He emptied his bladder voluntarily, which he could not do before operation, and the girdle pain moved downwards about an inch.

Nine days after operation improvement continued in the way of less pain and the ability to sleep all night and to have long naps in the daytime without morphine, a thing that he had not been able to do for about two years. He could make use of his abdominal muscles in defecation, and the girdle sensation moved downwards.

He continued to improve, the improvement lasting for about five months, when the symptoms returned as bad as ever and in June of the following year (1899) he returned for reoperation, in the hopes of receiving temporary respite at least. He complained of constant sensitiveness in the lower sacral and coccygeal regions, the clonic spasms had returned, and the left arm and shoulder exhibited tingling pain at times. There were attacks of spasm in the spinal muscles and moderate spasm in the lower extremities.

He was seen by another neurologist at this time, who suspected a tumor at the conus, and with considerable hesitation I consented to operate at a lower level. I removed the two last dorsal and two upper lumbar laminæ and found a similar condition as at the first operation; a tense dura, through the opening of which bulged a distinct pial membrane full of fluid under pressure. No tumor of the cord or of the cauda equina was found. A probe could be passed upwards to the level of the scar without meeting any resistance. The dura was not sutured and the wound was closed with silkworm gut. The symptoms were benefited less by this operation, but his general condition improved somewhat.

CASE 3. Henry K., 14 years old, a professional acrobat slipped in turning a back somersault nine weeks before entrance to the Boston City Hospital, landing on the back of his neck. He rose immediately to his knees but was unable to rise any further, and since the accident he had been unable to walk. He remembered that he was positively unable to move his legs the day after the accident, and that he used his hands awkwardly while eating. He was taken to a hospital in Virginia and electricity was given. He had some pain at the seat of injury immediately after the accident but has had none since. He was catheterized after the injury and had incontinence since, but he had been able to control his rectum. He said that his forearms and hands had "grown thin." Temperature at admission 99°, pulse slightly irregular, 84. Examination of abdomen negative. He lay relaxed on his back in bed.

Dr. W. N. Bullard examined him, and his notes are as follows: Head, pupils, etc., normal. Upper extremity: Extreme atrophy of flexors of the forearm and less of the other muscles, though the atrophy is marked nevertheless. The hands are claw-shaped. All motions in the upper extremity are possible but very weak, except opposition and abduction of the thumbs. The wrist is extended on flexion of the fingers. Diminution of sensation is not marked over the left upper extremity; in the right upper extremity it is normal. Sensation is diminished below the iliac crests. Total paraplegia, but apparently no atrophy. Cremasteric reflexes present. Knee jerks increased, no clonus. Babinski present. Some rigidity of lower extremities on passive motion.

In addition to this the following notes are recorded: Stereognostic, pain, tactile and thermal sensation normal in hands, legs and forearms. Flexion and extension of forearms strong. Can not rise in bed without strong assistance. No obvious atrophy of the muscles of the back. Paralysis of the limbs is at times flaccid, at times spastic. There is a suggestion of Kernig's sign until the thigh has been held flexed for several seconds, and then the muscles relax, allowing complete extension of the lower leg on the flexed thigh. The skin is normal. There is no scoliosis.

On August 19th I removed the seventh cervical and first dorsal laminæ under ether. The dura was translucent, not pulsating. On being opened a small quantity of fluid escaped. Pressing against the dura was a pial sac containing much fluid under pressure. The pia was attached to the dura and laterally to the cord and nerve roots so that in freeing it fresh bleeding took place. The pia was freed within the reach of a probe. The pia and dura were not closed. The external wound was closed with silkworm gut, allowing for rubber tissue drain. No shock.

August 23. Has had a good deal of pain in the neck requiring morphine. Has been on a Bradford frame since operation.

August 27. Primary union. General condition improved.

August 31. Much improved. Can move head freely without pain. No control over legs.

September 4. Sitting up in bed.

September 14. Condition of arms improved. Can raise his body from a chair with his arms. No change in the paralysis of the legs.

September 18. Discharged to his home.

In May following operation, that is, nine months later, the boy ran to meet me on the street and all that I could find that he complained of was a slight atrophy of the back of one forearm. Since then I am told that he returned to his profession as an acrobat.

CASE 4. Michael J. D., 44 years old, fell May 6, 1903, from a load of leather, striking his head and shoulders on the pavement. He was paralyzed at once in his lower extremities and was taken to the Boston City Hospital Relief Station. Examination there showed equal pupils, complete anæsthesia below the nipples, knee jerk present on both sides, no ankle clonus, no plantar reflex, no bony deformity, distended abdomen, and an approach to priapism. He was later transferred to the main hospital and on the 10th it is recorded that the temperature had slowly risen to 100°, but the pulse remained slow. There was complete paralysis of the legs, thighs, forearms, and muscles of the abdomen. The anæsthesia remained as noted. The knee jerks and plantar reflexes were absent. Retention of urine.

May 14. Normal temperature. Pulse 60. Dr. P. C. Knapp saw him in consultation and made a diagnosis of crush of cord at first dorsal segment.

On May 22d I operated. Soon after starting anæsthesia the patient choked and became cyanotic, requiring artificial respiration for a few minutes. The sixth and seventh cervical laminæ were removed. In the muscles were evidences of old hæmorrhage and laceration. No fracture was found. On opening the dura a small amount of fluid escaped. Pushing up against the dura was a firm, pial membrane beneath which a large amount of clear fluid was contained. The cord appeared to be normal. The wound was closed, allowing for a temporary rubber tissue drain. No shock. On the afternoon of the operation the temperature rose to 102.4°, but soon dropped to normal. Considerable fluid drained out. Wound clean.

June 4. Temperature irregularly elevated recently. Beginning motion in forearms but no change in anæsthesia. Respiration shallow, apparently without use of intercostal muscles.

June 11. Incontinence. Can flex and extend forearms slowly but has no control of hands. Bed-sores beginning over sacrum.

June 16. Wound firmly healed. Incontinence of urine and fæces.

June 20. Necrosis in all prominent parts of body.

June 24. Worse. Delirious. Temperature rising, pulse 120.

July 6. Worse. Almost constant motion of both arms. Irregular temperature, bad pulse.

July 9. Died. No autopsy.

CASE 5. Edward C. B., 38 years old, entered the Carney Hospital on May 9, 1906. He had a primary lesion ten years before, followed by typical secondary manifestations for which he was carefully treated.

Dr. L. P. O'Donnell, assistant neurologist, examined him carefully and from his notes I quote freely. About nine years ago patient noticed slowly increasing weakness of his legs and undue fatigue after moderate exertion. He had been able, however, to attend to his work as a commercial traveler up to the present time, though for the last year and a half he had used a cane.

Two years ago there was a sudden onset of numbness and hemiplegia lasting for two or three days, but he does not recall which side was affected. For two years he has not had full control of his sphincters and for a year and a half he has used a catheter. During this time he has had a dull ache and feeling of weariness in the sacral and perineal regions. He has had no sharp pain or girdle sensation. Mentally he is clear.

He walks without ataxia, does not sway with his eyes open. Very slight Romberg is present. Cranial nerves and special senses normal. Pupils show slight myosis but react normally to light and accommodation. At a later examination the pupils were unequal, the left being dilated. Supinator and triceps reflexes are sharp, but within normal limits and equal on both sides.

Reflexes of the lower extremities are exaggerated. There is slight ankle clonus on both sides and Babinski on both sides. The muscles of the lower extremities are well nourished but spastic in a high degree. No disturbance of sensation to touch and pain. No line of hyperæsthesia. There is, however, a well marked zone of muscular and cutaneous irritability corresponding to the distribution of the lumbar and sacral nerves, and throughout this zone slight irritation of the skin or tapping of the muscles produces muscular contractions with a large degree of spasticity. The strength of the legs is not markedly diminished. There is tenderness, on pressure, over the spinous processes of the last dorsal and first lumbar vertebræ.

The diagnosis of a late syphilitic manifestation with cerebrospinal distribution in islets was made, with probably a well marked and localized meningomyelitis involving probably the first and second lumbar segments of the cord.

Operation May 15th under ether. The three lowest dorsal or two dorsal and first lumbar laminæ were removed. There was considerable hæmorrhage from large epidural veins, so much so that it was thought best to pack and delay opening the dura for forty-eight hours. Increased spastic contraction and pain from the packing, with rise of pulse and temperature followed this procedure, so, on May 17th, I opened the dura. Beneath it the pia was distended as a definite membrane, slightly opaque and thickened. Clear fluid was evacuated and the cord appeared normal without evidence of tumor or thickening. The posterior roots looked normal. Some of the pial membrane was removed and the dura was closed with catgut.

Exploration upwards and downwards inside the pia failed to show any tumor. The wound was closed

with silkworm gut, allowing for a capillary drain to the dura at the lower angle.

The patient reacted well from the operation but within twelve hours the pulse rose to 120, with nausea and vomiting. He spent a poor night, with increasing vomiting, a temperature of 105.5° and pulse 130. Lavage was tried but he rapidly failed and died about thirty-six hours after the second operation.

Autopsy showed septic meningitis in cervical region as cause of death. Sections of the cord showed no tumor, glioma, or other primary lesion.

CASE 6. Gilbert, N. S., aged 37, architect, was seen in consultation with Dr. Alice N. Gray and Dr. John Jenks Thomas in the latter part of July, 1906. In 1894 he had trouble with his right upper arm that was diagnosticated and treated as rheumatism for three years. An X-ray then showed it to be osteomyelitis and from that time until 1903 he had many operations, finally losing the arm at the shoulder joint.

In December, 1905, he began to suffer from severe "lumbago" pains, stiffness, and numbness of the lower extremities. While on jury duty at about this time he became greatly fatigued and one day while rising from a chair he fell suddenly, and from that time was practically bedridden.

Four or five months before I operated upon him he had a right middle ear abscess which cleared up without any after effects. Within a month or so after operation deafness started in the left ear and has slowly increased until now it is practically complete.

Dr. Thomas saw him shortly before my visit and he has kindly allowed me the use of the following notes. In December, 1904, the patient had pain in his hip and soon afterwards noticed that the right leg felt weak and that the knees would give way. While in bed the knees would flex.[1] Stooping caused pain and he had to give up work in December, 1905. He noticed that the right side of his body would sweat, but not the left side. In July, 1906, he had cramps in his legs with flexion and adduction. Numbness was less marked at this time than before. There was no trouble in controlling the bladder or the rectum, though he suffered from constipation, requiring a suppository daily. Examination showed the patient lying in the dorsal position with the thighs drawn up nearly to a right angle with the body and the legs acutely flexed on the thighs. The legs were in condition of spastic paralysis with marked adductor spasm which, however, relaxed at times. The spasmodic contractions were for the most part in the thigh muscles, particularly the adductors and recti femoris and in the abdominal muscles. Handling the muscles and passive movements of the legs brought on a spasm and practically there was no voluntary control over the lower extremities.

Sensation to touch, pain, and temperature was about normal in the feet and legs. In the thighs and abdomen the prick of a pin started up a muscular contraction. In the trunk, at the level of the eighth or ninth thoracic root, the prick of a pin was felt as a burning sensation.

[1] This was preceded by a period of spasmodic extension and scissors-like action.

The patellar reflexes could not be tested. There was double ankle clonus and Babinski's sign. The abdominal and epigastric reflexes could not be tested. Reaction of the leg muscles to the faradic current was good.

The lower thoracic region of the spine was rather rigid on passive motion while the movements of the lumbar spine were much better. There was slight diffuse tenderness to percussion in the lower thoracic region. No deformity of the spine.

In one of my own examinations I found the knee jerk increased on the right, slight or absent on the left, with a similar variation in the ankle clonus. There were no bed-sores. No history or evidence of syphilis.

At operation on August 2d, I removed, under ether, the sixth, seventh, and eighth dorsal laminæ and through a second incision removed the second lumbar lamina. The dura in the upper wound was opened and a considerable quantity of serum escaped under moderate pressure. This fluid was clear at first and then became more and more bloody, until finally there was a steady outpour of venous blood which apparently came from below the level of the incision and from between the dura and pia. The dura appeared thickened and opaque on the inner surface. The field could not be dried long enough to obtain a clear look at the cord. The dura in the lower incision was pricked, and serum, followed by blood, escaped. Both wounds were closed with silkworm gut, allowing for a capillary drain to the dura. He recovered well from this operation and in ten days the pain in the legs had ceased. By making an effort he could straighten the knees to about 130° and there was some general improvement with respect to the spasticity of the legs and abdomen. Otherwise he was the same as before operation and was discharged August 15th.

Two months later, October 8th, I again saw him with Dr. Gray and Dr. Thomas, and the latter's notes state that after the operation he could move better and had less spasm, but that within the last two weeks the spasm had increased. At no time had he lost control of the bladder. Examination showed paralysis and spasm the same as before. Sensation for touch and pain was not lost in the feet, legs, or trunk but was much diminished from below the level of the tenth thoracic segment area. Tenderness to pressure was at this time most marked at tenth thoracic spinous process. I noted that the ankle clonus on the right was less marked than formerly and that the Babinski sign was present on both sides.

On October 16th I operated again, removing the twelfth dorsal and first and second lumbar laminæ. There was no pulsation of the dura and no growth between the dura and the spine. On opening the dura a well marked, definite, bluish white membrane in the pia arachnoid bulged forth into the dural slit, there being no fluid between it and the dura.

This membrane formed a definite sac, apparently open below but at least partly closed at the upper end which lay under the lower portion of the upper scar. Clear serum escaped from the pial sac, exposing the clonus and the upper portion of the cauda. The pial

sac was cut away and the dura closed with catgut. Nothing abnormal was seen in the cord, and nothing abnormal was felt by a probe passed upwards and downwards. The wound was closed in layers with catgut allowing for a cigarette drain to the epidural fat on account of oozing from the diploe of a lamina.

On the following day the patient could straighten his legs somewhat and was free from the painful spasms. In ten days he was sitting up, the wound being firmly healed, and the legs did not flex spasmodically when he put his feet to the floor, as happened before operation. He had no pain in his legs and if the skin were rubbed or stroked no spasm was produced. He went home October 29th.

When seen in November, 1909, (three years after the second operation), he was well, able to do a hard day's work as inspector of buildings that required climbing stairs and ladders. As he walked the knees did not fully extend and the legs were slightly adducted, more than is seen in the average individual, but unless one were critically observing his gait it is doubtful if anything abnormal would be noticed. He had normal sensation and normal knee jerks. On full extension at the knee the ham strings were slightly tenser than normal. When overtired he would unconsciously, in his sleep, forcibly extend the legs. He had no pain.

He stated that by Christmas following operation he could stand up with assistance and in the following June he walked with a cane. By July he was able to take a long car ride and in the autumn of 1907 he was doing a full day's work..

After the patient's return home from the second operation Dr. Gray's treatment played so important a role in his recovery that I shall quote freely from her notes which she has kindly loaned me. She says: "As soon as the patient returned from the hospital I found the spastic condition still present to some extent, but the clonic spasm could not be excited. The thighs and legs were still held firmly by the contracted flexor and adductor tendons. At the end of two weeks I advised light massage and passive motions for the thighs and legs, leaving the back and abdomen entirely alone. Two weeks later the patient felt a return of the violent spasms of the abdominal muscles and was discouraged. I discontinued massage as soon as I felt that the patient had grounds for his suspicions and prescribed gr. 1-100 of corrosive sublimate with gr. vii of iodide potassium, three times a day.

"There was no more complaint of the spasm, and again, two weeks later, I returned to the medical gymnastic treatment, giving it myself in order to watch the result better. The internal treatment was continued.

"Slowly and tentatively I began with massage and passive motion, stretching the tendons very slightly beyond their voluntary limit. As the spastic condition grew less and only the mechanical contractions of the tendons remained to be overcome I increased the number and strength of the treatments, which by this time consisted of violent and continuous stretching of the contracted tendons. Manual force and resistive exercises, both manual and with apparatus, for the muscles antagonizing the contracted groups, were employed, and at the end of six months the patient was walking with the aid of a cane and crutch. Up to this time and several times later an acute swelling appeared occasionally in the left knee, apparently following a decrease in the drug treatment and always disappearing soon after the medicine was readministered. The medical gymnastic treatment was continued for a year with steady and, towards the end, rapid improvement, the adductor tendons being the last to yield. The medical treatment has not been given now for nearly two years."

The behavior of the joint swelling to mercury and the late progressive deafness, which, however, did not yield to drug treatment, suggest a specific cause for the spinal lesion. No treatment before operation had any influence on the paralytic phenomena, but this would be expected from what we know of the experience of others. As stated in the beginning, no history or evidence of a recent or an acquired syphilis could be obtained.

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THE CARE OF PREGNANCY AND LABOR COMPLICATED BY NERVOUS OVERDEVELOPMENT

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THERE is a widespread theory in the medical profession as a whole that the duty of the obstetrician is satisfactorily performed if the maternal life is saved. The life of the child is usually considered as a distinctly secondary matter, and the after health of the mother receives little or no consideration from the average practitioner. The untoward accidents which so commonly occur during pregnancy and labor are explained away in some more or less plausible manner, and the individual attendant is prone to shift the responsibility for the unsuccessful outcome of the case from his own shoulders where it really belongs, and give reasons for his failure which only accentuate his own shortcomings.

Unquestionably the preservation of the mother's life is the foremost duty of the obstetrician and cannot be subordinated to any other consideration. Somewhat less important, but none the less essential to the successful conduct of a case, is the life of the child, and no man should feel that he has conducted a case of pregnancy and labor properly in which a child which has reached a viable age is lost, when he has had personal charge of the patient throughout the pregnancy and labor. Some cases will of necessity arise in which the interests of the child must be endangered or sacrificed to preserve the life of the mother, and the prompt acceptance of the responsibility of saving the mother at the expense of the child is the mark of a man who appreciates the conditions which call for the sacrifice of the less important life in order to save the more important rather than to lose both.

If no untoward complications arise during pregnancy which demand the sacrifice of the child, we come to the conduct of labor, and here the duty of the obstetrician is to so conduct the labor that mother and child shall receive no serious injury, physical or nervous. A labor which results in invalidism to the mother through lack of appreciation of the conditions present, due either to physical injuries, which have not received proper attention, or to nervous injury through a blind adherence to a conservatism which demands non-interference with natural processes, must be counted as a failure, and the obstetrician who can number many such cases in his practice should consider most carefully whether the reason is not his own unfitness for the work, rather than the conditions which are present in the individual patients.

From the standpoint of the child, although death may not be caused by ill-advised methods of delivery, many serious injuries may be inflicted which may seriously affect its after health, such as cerebral hæmorrhage or obstetrical paralysis of lasting character. Each injury must be considered as at least a partial failure to conduct the case properly, unless before delivery the possibility of such injury is considered and the choice of treatment made freely with deliberate intent to run serious risks for the child for the sake of lessening the risk to the mother.

The after health of the mother is a consideration which should receive serious attention in each individual case, but which is seldom considered until too late. We may have no doubt as to the outcome as regards the life of either patient, but our responsibility cannot end there. Each patient must be carefully studied, particularly in relation to her power of standing pain and what effect the long continued pain of labor may have on her after life. The nervous history of the patient must be carefully studied to learn how she has endured such burdens as have been laid on her in the past. Is she nervously equipped to undergo what is usually a severe though not an overwhelming strain for a normal woman? If these questions can be satisfactorily answered so that we feel that a patient can properly be subjected to an ordinary labor, our course is

clear and we have nothing to do except to foresee, as far as possible, the occurrence of possible complications of labor.

In considering the conditions which exist to-day we must recognize that the modern civilized woman is a doubtful risk nervously, although she be physically well equipped. It is therefore an important part of our professional duty to lessen the strain during pregnancy and labor by every means which modern surgical science has given to us, in order that the great event of her life may leave no serious after effects, since there is no question but that many women have been more or less seriously invalided as the result of perhaps insufficient or improper care during pregnancy and labor. Of course the physical conditions resulting from labor, the repair of lacerations, and the prevention and cure of displacements, form a part of the duty of the obstetrician, and it should be his aim, difficult as it is of accomplishment in many cases, to bring every patient through the so-called physiological process, so that he can dischârge her in as good condition as before the strain was undergone.

Obstetrics has long been taught independently of medicine and surgery, as if the three sciences were independent, but no thoughtful practitioner can fail to realize that scientific obstetrics means the application of the principles of medicine and surgery to the care of pregnancy and labor. The obstetric art is not a mysterious science and the application of common sense should be its dominant principle. Tradition has been a large factor in obstetrics for many years and still continues to be so. The reason for this is evident. Pregnancy and labor have so long been considered as natural physiological processes that it has been commonly said that the patient would do just as well if a doctor were not present at the time of labor, except for the prevention of hæmorrhage, and in the occasional case where the intervention of the obstetric art is necessary. There is no question but that pregnancy and labor should be natural processes, but the changes which have taken place in the nervous organization of our modern women, particularly the overeducated or overcivilized among our population, are so great that a large proportion have ceased to be natural women. The nervous organization has overshadowed and in many cases has dwarfed the physical development. The great frequency of nervous breakdowns in young women who should be in the prime of life shows that we are no longer dealing with natural women. The increasing frequency in which improper development of the pelvic organs, with the common accompaniment of lack of proper development of the pelvis, results in various degrees of pelvic contraction and is a sign of the times, and those whose practice lies among such patients are constantly impressed with the number of the unfit for whom they are asked to assume responsibility. In the profession as a whole there is a great lack of appreciation of these conditions. Every pregnant woman is considered normal until some untoward symptom calls attention to the fact that she is not so. In my opinion every patient brought up under the conditions of our city life should be considered as abnormal unless she can be proved to be normal by the most searching examination. The fact that the general practitioner receives an inadequate fee for the care of an obstetric case naturally tends to diminish his interest in obstetrics and leads him more and more to assume that all cases are normal. Another reason for lack of appreciation of the conditions is that obstetrics is disliked by the majority of practitioners and is done only as a routine to aid in building up the family practice in which they are more interested. It is natural under these circumstances that the average practitioner should not seek for the abnormal and should be satisfied as long as no evident complication arises.

It is the natural result of these conditions that the general practitioner should consider obstetric cases as disagreeable necessities, to be handled according to certain fixed rules, and should assume the great majority as being absolutely without abnormal possibilities and treat them as such, although no means have been taken to ascertain whether they conform to the normal or present some feature at variance with it. It is a prime necessity to the proper conduct of obstetric cases that each case should primarily be considered as offering every possible variation from the normal, and

that it should only be placed in the class of normal cases when an exhaustive study has failed to demonstrate the existence of some abnormality.

The study of the pelvis and its demonstration to be normal by a careful mensuration is admitted at the present time to be a part of the duty of every obstetrician, but the majority of practitioners lose sight of the fact that it is not the absolute size of the pelvis, except in the rare case, which is important, so much as the relative size as compared to the individual child.

A second consideration of importance is the estimate of the muscular power in the individual patient, whether a given patient is likely to be able to deliver herself without undue exhaustion, or whether the muscular power will probably fail before the delivery is accomplished, and operation become necessary on an exhausted patient. In women of poor muscular development, and in those who through lack of exercise are flabby muscularly, it is probable that the expulsive power of the uterus will be inadequate for the work to be performed, and although in many cases the reverse will be found to be true, in the majority of women who are poorly equipped, labor will be abnormal and recourse to the obstetric art necessary to effect delivery, and if operation is deferred until the patient is nervously and physically exhausted, an unsatisfactory recovery is almost inevitable. The question at once arises as to what is the best method of treating these cases in order to insure a satisfactory result, not only at the time of delivery but as regards the after health of both patients.

A third factor to be considered is the probable nervous resistance of the patient, whether in the first place she is liable to have a nervous explosion at the time of, or shortly after labor, even although not exhausted physically, and in the second, whether the after effect of pain and the exhaustion of labor may not have a lasting serious influence on her after life. In the uncivilized woman these conditions need not be considered, but in the modern society woman they are of considerable importance.

It is necessary in each case to learn what the patient's early life has been, aside from actual disease, in order to appreciate what the probabilities are. In many instances it will be found that in order to turn out the girl as a finished social product at the proper age, she has been subjected to such educational and social strain at the time of puberty and later, that instead of developing normally a forced mental and nervous development has taken place, which has overshadowed the physical, and she is merely a bundle of nerves, reacting out of all proportion to every slight impulse even though physically she may be well developed. In addition to the improper conditions under which she has lived, the strain of entering society often has a serious effect. Such exercise as is taken has been at the expense of proper rest and recuperation, and is simply in many cases an added burden rather than a relaxation. It is estimated in Boston that the majority of the girls who enter society have at least one or more nervous breakdowns, demanding at least a modified rest cure, before reaching the age of twenty-five, the time when the woman should be at the height of her powers. This condition naturally leads to the conclusion that at least half of the society women are nervously unfit to undergo unnecessary burdens in their after life, and every safeguard must be employed to prevent the strain of pregnancy and labor from producing a serious, and perhaps lasting effect. The same may be said to be true of a large proportion of college women who have simply overtaxed themselves in other ways and have produced a similar result.

A third group which must receive careful consideration, is the class of women who have always been sickly and delicate, though perhaps have never had any serious illness; patients who unquestionably would not have reached maturity, except for the unusual care which has been bestowed upon them and who are obviously both physically and nervously unfit for the strain of maternity. This preservation of the unfit and the constant overstrain of those originally fit produce a similar result, and have developed a class of women in the community who are bad subjects for pregnancy and labor, and who have all that they can do to maintain their equilibrium under the ordinary conditions of life, and who necessarily fail when an added burden is incurred.

Another class which must receive careful attention, both during pregnancy or at the time of labor, are the patients who perhaps have shown no definite weakness before pregnancy and in whom during pregnancy no definitely pathological conditions can be discovered, but who develop a lack of accommodation, if so it may be called, to pregnancy. The patients who suffer from minor toxemic conditions, increased and unduly prolonged vomiting, but who never reach a point definitely pathological; who do not improve physically, as every woman should, during pregnancy, but who are distinctly in worse condition at the end of pregnancy than at the beginning; who have been unable or unwilling to take proper exercise in order to improve their physical condition on account of the discomfort involved, or because they are oversensitive about appearances, and who come to labor flabby and in no condition to go through a severe physical strain. In these cases it must not be forgotten that the cardiac muscles suffer in proportion to the general muscular condition, and acute cardiac dilatation with its concomitant symptoms is a frequent result of the strain of labor, as is so often seen when an untrained athlete in the spirit of competition subjects himself to a contest for which he is poorly prepared. When all possible physical and nervous factors have been taken into consideration, there remains one other point which must always be doubtful in many cases, and that is: it is impossible to estimate accurately the effect of the pain of labor as such on the given patient. The fact is evident that one patient will stand what seems to be severe pain with little or no reaction, whereas the next may react intensely to an amount of pain which seems almost negligible. In these cases the effect of pain, *per se*, if endured for any length of time, on the after health of the patient deserves serious consideration and the question of either ending labor at the moment when pain seems to be increased beyond the normal, even though operative interference is demanded practically at the beginning, or at least very early in labor, is one which must be seriously considered in order to prevent a nervous breakdown on the part of the patient.

The general indications to be met in the treatment of unfit parturient women at the present time may be divided into prophylaxis and palliation. In prophylaxis it seems to me that a great deal is possible, perhaps not so much in the individual case as seen to-day, as in the future. There can be no question but that the pernicious influence of early education is one of the most serious factors with which we have to deal. The social standard is at the present time so definitely set that a girl's education is crowded into a few years, so that she can be turned out as a finished society product at a definite age with all the modern accomplishments, and this necessitates a system of hothouse education during the years from twelve to eighteen, at the time when she is undergoing her greatest physical development. Naturally the average girl must suffer in the attempt to keep with her better equipped sisters, and to reduce the damage done to the minimum it is necessary to point out to the parents what the logical outcome of this system of development must be. It is of course, impossible to change at once a system which has been the outgrowth of years of social competition, but I believe that few parents would be so socially ambitious as deliberately to sacrifice their daughter's welfare if the risks incurred are carefully pointed out and the means for minimizing the damage furnished. It is the rule rather than the exception at the present time that the day and evening of the city bred girl is entirely taken up with fixed engagements, and no time is left for rest and relaxation.

I believe that a great deal can be accomplished in the future, but at present the question that we have to meet is how to deal with the patients who come to us for care at the present time, with reference to reducing the strain, which they must undergo, to a minimum. In the first place, each patient must be very carefully studied in order to determine the class in which she belongs, whether she is to be classified as definitely unfit for the strain of labor and to be treated as an abnormal patient by abnormal methods, or whether she is to be considered as a relatively normal patient, and only to be treated by unusual methods when she shows signs of physical or nervous failure. If a patient is considered as being absolutely

or relatively unfit, extreme care must be used throughout the pregnancy to guard against possible complications. The hygiene of her life must be absolutely regulated and she must be treated from the start as if pregnancy and labor were pathological conditions, which, unless held in check, are sure to result seriously. Many of these cases when the time for delivery approaches can be recognized as unfit to go through the strain of an ordinary labor, even though early operation may be practiced to diminish the risk, the question of pain and exhaustion being serious matters for the individual.

It has long been recognized that many of these patients will stand operation well, though a long continued strain will predispose to either physical or nervous collapse, and there only remains in the proper care of these cases the choice of operation, whether the patient shall be delivered by Cæsarean section with no indications except her general condition, or by dilatation of the cervix and extraction, by forceps or version.

In the cases on the border line and in those in whom it is calculated that no definite harm will result from labor much may be done toward lessening the pain and exhaustion consequent on labor, by the early use of anæsthetics, ether or chloroform being used early; or at such time in the first stage as the patient seems in need of relief, morphine and scopolamine being employed in carefully graded doses. In all cases, especially in those who seem relatively unfit to undergo the strain, I believe that the advantages of surgery should be employed and the patient delivered instrumentally at the earliest moment possible without the risk of undue damage. This time will necessarily come earlier in the practice of an expert than in the practice of an average practitioner, and can only be determined by the estimate of the individual case, as to when the risk in operation is less than the danger of permanent damage by prolongation of labor.

Another important part of the care of the obstetric case is a careful supervision of the convalescence and the repair of the damage caused by labor. The most important part of this is prolonged rest in bed, with the patient under conditions of mental quiet and absence of strain. The custom of allowing patients to get up at the end of ten or twelve days is to my mind a pernicious one, and I believe that three weeks' rest in bed after confinement is none too long to insure a good result. During the convalescence, after the tenth day much may be done, as pointed out by Gellhorn, to keep up the strength and to aid and improve the general condition by properly regulated exercises. Before the patient is allowed to get up, the pelvic condition should be carefully ascertained; any malposition of the uterus should be corrected, and if there is any tendency to subinvolution, the patient should be kept quiet until satisfactory involution has taken place. If lacerations require operation, either because they were not sutured at the time of delivery or because of failure to heal properly, the condition should be remedied before the patient is discharged from care, although it is wiser in the case of moderate cervical lacerations, to delay until it can be learned whether they are giving symptoms or not, rather than to subject the patient to an immediate secondary operation which may not only prove unnecessary but which may seriously complicate future deliveries. Perineal lacerations are more important and require immediate operation as soon as the local conditions will warrant it, before a condition of prolapse of the vaginal walls can occur.

The proper treatment of an obstetric case depends on a careful study of the conditions in the individual case. In certain cases the treatment can be predetermined by the previous history of the patient, while in other cases progress of events must be watched and the conduct of the case determined according to the conditions which arise. If the patient belongs to the definitely overcivilized class, the treatment must be so chosen as to be adapted to the special conditions present.

In certain cases it will be found that delivery before labor begins is advisable, and whether delivery shall be effected by the abdominal route in the absence of other indications or by accouchement forcé, must be determined by the other factors in the individual case.

In a second group of patients it will be unquestionably wiser to allow the patient to go into labor and see what she can accomplish

without undue exhaustion or suffering and to deliver her immediately, either when progress ceases to be perfectly satisfactory or when the effect of labor becomes evident. If the patient is a multiparous one, the history of previous labors must be taken into account, and if any abnormal condition complicated previous labors, it is to be expected that similar conditions will arise in the progress of the individual case, since it is the general though not invariable rule, that if the uterus has acted unsatisfactorily in one labor it will do so in subsequent labors, and the condition must be met promptly and actively. If the previous history contains no clue to the treatment of the individual case and if the general nervous and physical conditions are fairly satisfactory, the patient should be allowed to go into labor, an attitude of careful watchfulness maintained, and labor terminated by operative means at the first indication of failure. This means, of course, that the obstetrician must have personal charge of the patient from the beginning of labor and not entrust the care of the early part of labor to the hands of a nurse, which is apparently a very common practice. It is only when he has watched the patient from the beginning that he is in a position to recognize slight departures from the normal, and it is well recognized that slight abnormalities can often be easily corrected, when if they have persisted for some time, delivery may be either extremely difficult or dangerous to both patients.

If operation is advised either before labor begins or during the progress of labor, the main indications of operation should be kept clearly in mind. The chief considerations are: in the first place the least risk to life of either mother and child; in the second, the minimum shock and possible physical injury to both patients; and third, the reduction of nervous strain of the mother so that labor shall have as little effect on her after life as is possible. When operation is undertaken either before labor begins or during labor, the choice of operation must depend to a considerable extent on the ordinary obstetric rules. The size, shape, and inclination of the pelvis must be taken into careful account and the relation of the individual child to the individual pelvis must be carefully studied. The number of previous pregnancies, with the intervals between them, and the behavior of the uterus on the one hand and the patient on the other, must receive careful consideration.

In primiparæ the age of the patient may be an important factor in determining the choice of treatment. In addition to age the length of time since marriage, with the previous history of miscarriages, must be taken into account, for if the patient who has been married for several years but has never been pregnant, or gives a history of several miscarriages, and this is the first opportunity for a living child, the life of the child must receive more consideration than in the ordinary case, and the treatment must be so directed as to insure the life of the child by any means which do not involve the sacrifice of the mother. The mental attitude of the patient and her nervous condition must be taken into serious consideration in all cases. If the child seems of paramount importance to the mother, as is usually the case in elderly primiparæ, it is legitimate to advise such operation as will insure the life of the child, even though there may be no definite indication present for the operation. If the patient has reacted badly to pain in the past, all means to make labor as painless as possible should be adopted. The patient's attitude toward future pregnancies must always be taken into consideration, and if the patient is unwilling to go through future pregnancies the case should be classed among those in which no unnecessary risk is taken for the child. The rigidity of the soft parts, the history of past nervous breakdowns, and the reaction of the patient to discomfort and pain in the past, must be taken into consideration. These conditions will often call for what seems an unusual, and according to many writers, an unjustifiable procedure. There can be no question but that abdominal Cæsarean section is the safest operation for the child, and if the child is of paramount importance, even though no other indication for operation exists, Cæsarean section should be the operation of choice.

We recognize to-day that the elective Cæsarean section, performed before labor begins, carries with it nothing more than the mortality and morbidity of accident, when performed by a competent surgeon, and, there-

fore, it may be unhesitatingly recommended to the patients who are in the class where the life of the child is of extreme importance. Aside from guaranteeing the life of the child it is attended with so little shock and risk to the mother, that I believe the indication should be widely extended, and that it is distinctly an operation to be performed on those who are considered unfit for the strain of labor and in whom it is feared that pelvic injury at the time of delivery may produce invalidism.

It is important to apply the ordinary surgical principles in the care of an obstetric case and we must recognize that many patients will undergo a serious surgical operation without marked reaction, who will react badly to pain and exhaustion. There is no reason why we should any longer allow the traditions of obstetrics, which originated when surgery was, to say the least, in a questionable position, to continue to govern our choice of treatment at a time when abdominal surgery on uninfected cases can be considered almost without risk.

Under modern conditions, it is almost criminal that obstetrics should be so largely in the hands of those who are either unfit or unwilling to take the time to do it properly, and who of necessity, because their experience is not such as to warrant them in departing from obsolete practice, follow blindly the traditions of a science which is recognized as a definite specialty. From painful experience I believe that the average general practitioner is perfectly satisfied if his patient lives, irrespective of the life of the child or the physical and nervous damage inflicted on the mother. Even in the most serious complications of pregnancy and labor, hæmorrhage and toxemia, palliative treatment is still the mainstay of the general profession, and serious conditions are allowed to go indefinitely without adequate treatment. Necessarily, the minor conditions which do not endanger the life of the mother, receive very little attention and in fact are largely disregarded and no departure from the routine in the care of an obstetric case is considered wise, if indeed any thought is given to it at all.

The interesting paper by Gellhorn of St. Louis on "The Physical Culture of the Puerperium," in which he states that out of 291 patients in 156 the causal relationship between confinement and gynecological disease was evident, shows more clearly than anything else what the present practice of obstetrics is and how great is the need for improvement of the methods in vogue.

In our larger cities among the American born population, the effects of overcivilization is an increasingly important factor and calls for serious consideration. That a class of women nervously unfit for the burden of pregnancy and labor exists, is often denied by those whose practice lies largely among the foreign born or in the newer civilization of the West. With us, however, where the struggle for social supremacy is active, and has been for generations, or where the desire for higher education, which is often improperly regulated, is predominant, the number of young women who suffer from nervous breakdown before marriage, with the liability of a more serious one later, should be a powerful influence in calling for a new obstetrics, based not on the average, but on the unfit.

THE FREQUENCY OF CONGENITAL SACS IN OBLIQUE INGUINAL HERNIA[1]

By WILLIAM HESSERT, M. D.
Professor of Surgery, Chicago Policlinic; Surgeon to the Alexian Brothers, St. Joseph's, and Cook County Hospitals

ALTHOUGH Camper, in 1762, and Wrisberg, in 1779, made dissections and called attention to the fact that inguinal hernias were due to a persistence of a patent processus vaginalis, the impression continued to prevail, even up to modern times, that a hernia was of necessity the result of some sort of violence with tearing or rupture of tissues.

A close study of this region at operation, and the examination of the sacs in situ and after removal, forces upon one the conviction that many of these cases were of congenital origin. This is not infrequently borne out by the clinical history. How else can we explain the case of a previously sound man, who after lifting a heavy load, suddenly acquires a bulging in the groin? How do we account for the different types of sac formation to be detailed later?

An understanding of the development and closure of the tunica vaginalis is essential, and explains the different varieties of sac formation.

MIGRATION OF THE TESTICLE

During early fœtal life the testicle is an abdominal organ and lies in the region of the kidney. It is surrounded by peritoneum, which forms posteriorly a sort of mesentery or mesorchium through which the vessels and nerves reach the organ. To its lower extremity there is attached a musculofibrous band, called the gubernaculum testis hunteri. This passes through the inguinal canal and is attached to the bottom of the scrotum. The testis in its descent reaches the internal ring about the seventh month. At this time a small indentation of peritoneum has formed at the spot where the gubernaculum leaves the abdomen. This is the beginning of the tunica vaginalis, and the same factor which causes the descent of the testicle operates in elongating the peritoneal process. The latter pushes through the inguinal canal into the scrotum, carrying in front of it the subperitoneal tissue, the infundibuliform process of the fascia transversalis, some fibres of the internal oblique muscle, which form the cremaster and the intercolumnar fascia. At the same time the testicle passes into the scrotum, which it reaches shortly before birth. ***The peritoneal diverticulum or incipient tunica vaginalis is present before the testis begins to traverse the abdominal wall.*** Hence the vaginal process cannot be considered the result of a bulging of the peritoneum caused by the testicle. On the contrary, the testicle and vaginal process are united, and descend together and if the agent ceases to exert traction the descent is arrested. The gubernaculum may even cause a diverticulum of the peritoneum, and leave the testicle within the abdomen. The right testicle is later in its descent than the left.

The peritoneal sac which preceded the testicle is at first continuous with the general peritoneal cavity, but soon after birth it becomes obliterated. According to Sachs the obliteration is accomplished ten to twenty days after birth. There are three points with reference to the vaginal process at which there is the greatest tendency to constriction and obliteration, namely, first, at the internal ring; second, at the external ring, and third, a point just above the testicle. The vaginal process first begins to close at or below the external ring, and more rapidly in a downward direction than upward. Normally, therefore, by the end of the first month of life the vaginal process has obliterated from the internal ring to the testicle, leaving only the tunica vaginalis testis. Evidences of the obliterated tunica in the shape of fibrous cords have been found in dissections, extending from the internal ring to the testicle.

Various theories have been offered to explain the closure of the vaginal process. Camper suggests it is the growth and development of

[1] Read January 7, 1910, before the Chicago Surgical Society.

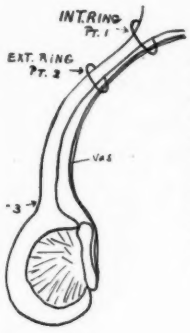

Fig. 1.

Fig. 1. The vaginal process is represented as being completely open and continuous with the peritoneal cavity. The internal and external rings are represented by ovals. The three points where obliteration of the vaginal process is said to begin most actively are indicated at point 1, 2, and 3, respectively. This case is one of "congenital hernia," employing the old nomenclature. The vaginal process has made no effort at all at closure.

Fig. 2.

Fig. 2. The vaginal process has almost completely closed, only a small infundibuliform process remaining, from the apex of which a fibrous cord (the obliterated tunica vaginalis) could be traced down to the testicle. Clinically there was a widened inguinal canal with some impulse on coughing. (Weiche Leiste, of the Germans.)

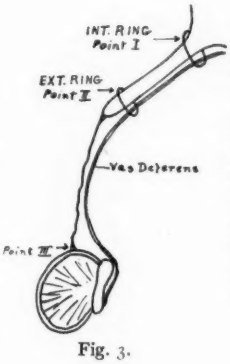

Fig. 3.

Fig. 3. This patient had a large direct hernia, and on the same side there was a potential oblique sac. The latter was very thin and glove-finger-like, and about the diameter of an ordinary pencil. It extended slightly beyond the external ring, was empty, and had evidently never been occupied by either bowel or omentum. From the fundus a band was traced down to the testicle. Obliteration of the vaginal process had been completed from point 2 downward, but remained open above.

Fig. 4.

Fig. 4. A case in which the sac presented a thick annular constriction, corresponding with the external ring. At this point strangulation of the contained omentum had occurred. In this case closure of the process had been completed above the testicle, and the constriction at the external ring shows the effort at closure at that typical point. In large hernias this constriction has usually been carried down into the scrotum.

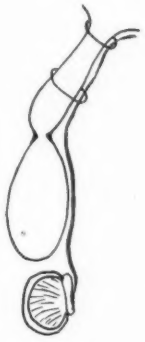

Fig. 5.

Fig. 5. A case similar to case 4, with the point of constriction displaced into the scrotum, forming an hour glass sac.

Fig. 6.

Fig. 6. A case with a small glove-finger-like sac containing omentum. To the fundus, which corresponded in location to the external ring, there was attached by a fibrous band a sausage-shaped sac filled with serous fluid. This hydrocele was intimately connected with the vas and vessels. There was also a small hydrocele of the tunica vaginalis testis, but no organic connection existed between the two hydrocele sacs. The explanation of these findings is that obliteration occurred at points two and three, but the intervening portion of the tunica did not close, forming the two distinct sacs, and the hernial sac above.

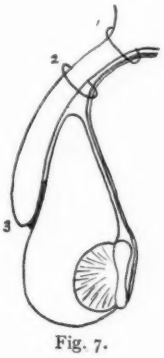

Fig. 7.

Fig. 7. A case in which there was found a moderately large hydrocele of the tunica vaginalis testis, in addition to a hernial sac, which was narrow and thin, overlapping the hydrocele, and adherent to same. In this instance the constriction took place at point three, and the sac remained entirely open above. Subsequently the hydrocele developed, growing in an upward direction, and overlapping the sac.

Fig. 8.

Fig. 8. A case somewhat similar to figure 8, except that the sac shows a constriction slightly above the external ring. The fundus of the hernial sac and the small hydrocele of the tunica vaginalis testis were adherent and overlapping.

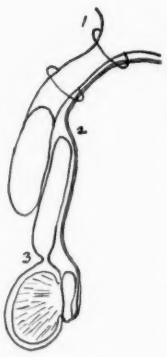

Fig. 9.

Fig. 9. A case in which there was a hernial sac, the distal portion of which was partitioned off and contained serous fluid. Extending upwards from the tunica vaginalis testis, and communicating with same by a small opening, was a sac closely adherent to and extending almost to the external inguinal rung. This latter funicular sac and the lower part of the hernial sac were overlapping and adherent. In explanation it is suggested that originally, before the hernia developed downward, these sacs were in contact, but not overlapping. At point two the vaginal process might easily have become constricted at two places, leaving a separate chamber in the fundus of what later became a hernial sac. The funicular portion of the vaginal process remained open from point two downward, making some attempt at closure at point three above the testicle.

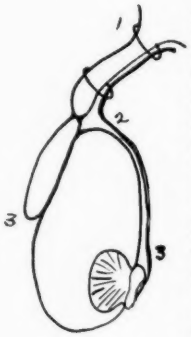

Fig. 10.

Fig. 10. A case very similar in its origin to case 9. There was a hernial sac extending slightly beyond the external ring. To the fundus was attached a thin elongated serous sac containing fluid. There was a large hydrocele of the testicle extending upward and closely related to the vas and vessels. The two serous sacs were overlapping and adherent. This case might be explained in two ways. First, that conditions were as in case 10, which it resembles very closely, save that there was no constriction at point three. Second, that the case early was like case 7, only that the hydrocele of the tunica vaginalis testis became relatively much larger, and as it grew upward, overlapped the other serous sac.

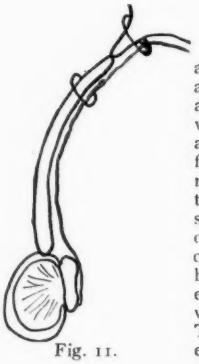

Fig. 11.

Fig. 11. In this case there was a closure of the tunica vaginalis at the internal ring, and at a point above the testicle. The intervening portion remained open and contained a small amount of fluid. The malformation was noticed since birth, and the patient, a boy of twelve years, was supposed to have a hernia. The case was one of funicular hydrocele, although there was a small hernial sac present. The lower end of the hydrocele was blended with the tunica vaginalis testis. The former was intimately adherent to the vas and vessels.

Fig. 12. A case of large bilocular or hour glass hydrocele, which simulated a hernia in that it was reducible into the abdomen, and gave an impulse on coughing. The scrotal portion of the hydrocele communicated with the abdominal (subperitoneal) portion by means of a constricting neck in the inguinal canal. This communication was the size of the index finger. In a case such as this it can be assumed that the vaginal process closed at point one, the internal ring. The entire lower portion remained patent, and in time fluid collected in the sac. As the fluid increased in amount, the inguinal canal was gradually distended, as with a colpeurynter, and afterward the sac bulged into the peritoneal cavity, but under the peritoneum. Eventually the hour glass formation was complete. How else could a hydrocele force its way into the inguinal canal, unless there was already a membrane extending into the canal?

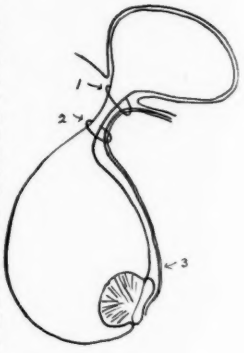

Fig. 12.

Fig. 13. This case was one of hydrocele of the cord, or funicular portion of the tunica vaginalis. The explanation is simple. Complete obliteration of the vaginal process took place between points 1 and 2, namely, the portion within the inguinal canal. Constriction also occurred at point 3, the point above the testicle. The remaining portion remained patent, and filled with fluid.

Fig. 13.

Fig. 14. A case in which there was a thin, narrow, glove-finger-like sac extending slightly beyond the external ring. To the fundus of the sac there was attached a small thin walled cystic body, which contained a small amount of clear fluid. Sac and cyst were closely adherent to the vas. This condition can be explained on the theory that the vaginal process remained open from above to slightly beyond the external ring. The funicular portion obliterated almost completely, leaving only a small portion at its upper end open, and this later filled with fluid.

Fig. 14.

the pelvis. Bell says it is a local irritation and contraction due to the passage of the testicle. Heoin believes the cause to be a local muscular contraction. Broca draws an analogy with monkeys, from the fact that in the case of monkeys that walk upright, the vaginal process closes similar to that of man, while in those that walk mostly on all fours, the process remains open.

The normal migration of the testicle and closure of the vaginal process having been considered, we now turn to the cases of faulty and incomplete closure for an explanation of the different kinds of sacs which we find at operation.

That incomplete closure of the vaginal process is by no means uncommon is shown by the following statistics.

Zuckerkandl — 100 infants.
- Vaginal process open on both sides..... 20 times.
- Vaginal process open on right side..... 12 times.
- Vaginal process open on left side ..... 5 times.

Camper — 70 infants.
- Vaginal process open on both sides..... 34 times.
- Vaginal process open on right side..... 14 times.
- Vaginal process open on left side ..... 8 times.

Fere — 146 dissections of infants up to eighteen months.
- Complete closure both sides..... 84 times.
- Incomplete closure both sides..... 33 times.
- Both sides entirely open..... 8 times.
- Open on one side only ..... 10 times.

Sachs — 155 infants.
- Complete closure both sides..... 47 times.
- Open on left side..... 8 times.
- Open on right side..... 32 times.
- Open on both sides..... 26 times.

Crickx — 32 infants up to two years of age.
- Open on both sides..... 13 times.
- Obliterated on both sides..... 16 times.
- Open on right side..... 4 times.

From these anatomical studies it would appear that the vaginal process on the right side remains open or unobliterated in some degree, twice as often as on the left side. This bears a significant resemblance to the preponderance of right oblique hernias. Finally in over one-third of all these infants dissected, come defect of closure of the vaginal process was found.

We will now seek to show how the various deviations from the normal closure of the vaginal process tend to explain some of the different types of oblique hernial sacs, which we find clinically at operation. The schematic figures here reproduced are made from actual cases in the author's practice.

How can a hernial sac at operation be recognized as of congenital origin? Has a congenital sac any characteristic features? While it is not possible in many cases to make a positive diagnosis, yet the following points are of value in making a decision:

1. Glove-finger-like and narrow sac, generally empty.
2. Thin wall.
3. Absence of subserous fat.
4. Trabeculated structure.
5. Annular constrictions, which oftentimes still correspond with the internal or external ring. Frequently the constriction has been displaced beyond the ring.
6. Thickening of fundus.
7. Fibrous process extending downward from fundus for a variable distance, sometimes attaching to the tunica vaginalis testis.
8. Close relationship of sac to vas deferens and spermatic vessels. The latter may be spread over the sac.
9. Sac still enveloped by fibres of the cremaster muscle.

CONCLUSIONS

1. The chief etiological factor underlying the development of oblique inguinal hernia in fully three-fourths of the cases can be traced to the pre-existence of a congenital sac, the result of faulty closure of a part or the whole of the vaginal process. This proposition has been sustained in the last one hundred operations in the author's practice.

2. Congenital malformation takes a minor part in the causation of oblique hernia, while it plays a most important role in the etiology of direct hernias. The malformation is manifested by an underdevelopment of the arching fibres of the internal oblique and transversalis muscles. These muscles do not in these cases join to form a conjoined tendon with insertion into the pubes, but pass directly inward to be inserted into the sheath of the rectus muscle. This leaves a triangular area, bounded above by the above mentioned muscle fibres, internally, by the edge of the rectus, and below by Poupart's ligament. This area is unsupported except by the transversalis fascia and the fascia of the external oblique muscle. This local

weakness is the underlying factor in direct hernias, although it has considerable influence in those cases where there is present a preformed sac.

3. The fundamental reason for the existence of so many oblique inguinal hernias being the preformed sac, it follows that at operation one of the most important steps consists in the proper ablation of the sac. By this is meant a high ligation, seeking to avoid the leaving of an infundibuliform process, which will tend towards a recurrence, no matter what the type of suturing has been. This will insure more permanency than many of the refinements in technique that are being suggested and claimed as essential. Our experience with femoral hernias sustains this view, as shown by the abandonment of the many very complicated operations in favor of a simple one with complete removal of the sac.

A FURTHER REPORT OF A NEW OPERATION FOR ARTHRITIS DEFORMANS AND CERTAIN OTHER DEFORMING AFFECTIONS OF THE HIP[1]

By FRED H. ALBEE, M. D., New York City, New York

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THE following paper is a later report and a supplement to the one published in The Journal of the American Medical Association, June, 1908, in which the first case herein cited was reported, and four others were mentioned. Since that time, the writer has added to his list of operations nine cases of advanced arthritis deformans, and two cases of tuberculosis in adults, thus making a total of sixteen. Of these cases, one, a woman forty-five years of age, died ten weeks after the operation. The wound healed by first intention and remained healed. However, an autopsy revealed a collection of pus near the hip (which had not been detected before death) and advanced chronic diffuse nephritis. The urinary report was negative before the operation, but casts, albumin, and all the elements of diffuse nephritis appeared directly after. The remaining thirteen cases have had uneventful convalescences, and the results have been extremely satisfactory.

The osteo-arthritic cases have varied in age from twenty-two to sixty-seven years of age; in weight, up to two hundred and twenty pounds. Two have been operated two years or over; two over one and one-half years, and three over one year. This operation has also been done, to the writer's knowledge, twelve times by ten different surgeons, all of whom have personally reported very satisfactory results.

It has long been a well known fact that a large number of progressive and advanced cases of arthritis deformans of the hip, with the accompanying deformity and disability, fail to be relieved by the conventional methods of hygiene, rest, and brace treatment, and

Fig. 1.

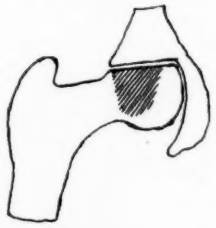


Fig. 2.

Fig. 1. The broken lines indicate the amount of bone to be removed. It is removed from the head and the acetabulum in different planes in order to secure the desired abduction of the thigh, when the freshened bone surfaces are brought together.

Fig. 2. Apposition of the freshened bone surfaces after the removal of the bone from the head and the acetabulum and the femur placed in slight abduction. The blackened area indicates where the cartilage is removed when the femur is strongly rotated outward for that purpose.

[1] Read at the Sixteenth International Medical Congress at Budapest, 1909, and before the Hoffa Orthopedic Club of Berlin, September 6, 1909.

Case 1. Note the flattening of the femoral head and the osteophytes at the upper and the lower rim of the acetabulum.

progress toward or to complete invalidism. There is also a second larger class, composed of working men, with dependent families, who cannot submit to the long brace treatment, even if there are good chances of their final recovery.

When the following marked anatomical and pathological changes are present, such as wearing away of the femoral head and acetabulum, eburnation, osteophytes, and the associated flexion and adduction deformity, how can satisfactory results be hoped for from the above mentioned expectant treatment?

A resection of the upper extremity of the femur has been practiced by Hoffa and others with very unsatisfactory results. Hoffa was one of the last to discard complete excision.

CASE 1. (Reported in part as stated above.) In October, 1906, M. N., a policeman 59 years of age, was referred to the writer by Dr. J. L. Moriarty, of Waterbury, Conn. An examination revealed arthritis deformans of the right hip. Hygienic and brace treatment were recommended and explained. It was declined on the ground that it was so long, and possible results were too uncertain, for a working man with a dependent family. The following May (1907), this patient returned to the writer and begged that something be done for him. He was admitted to the Post-Graduate Hospital, May 14, 1907, and gave the following history: Age 59, policeman for the past twenty-five years. Three years before he first began to notice pain and stiffness in the right thigh and hip. Soon after this, he went to Mt. Clemens, where he took a considerable number of baths. His general health was improved, but the pain and disability continued as before. Two years ago he was examined by a physician, and told that his right hip was dislocated, and that the right leg was two inches shorter than the left. The symptoms became so severe that, three months after, consulting writer in December, 1908, patient went to New Haven and submitted to an operation, the nature of which could not be ascertained. Lameness, stiffness, and pain continued unabated. The physical examination revealed a muscular man with a pale and careworn expression; a marked right limb. His right shoe was built up with a cork extension two and one-half inches thick. The leg was much atrophied and markedly adducted and flexed. A long linear scar was noted over the right trochanter. The actual bony shortening of the right was one-fourth of an inch. The practical shortening was two and three-fourths inches. The motions were very slight except for the presence of about one-half of the normal amount of flexion. Attempts at passive motion were painful. There was some muscular spasm. A skiagraph showed the head of the femur much worn away and flattened, with many bony outgrowths about the rim of the acetabulum.

In view of the disorganization of the joint, the marked adduction and flexion, with firm muscular contractures, and the progression toward bony obstructive ankylosis with the leg in the above mentioned faulty position, in a person so large and muscular, it seemed best to aim for an immediate firm ankylosis, by means of an operation, if possible, and in order to compensate for the existing practical shortening, to place the limb in a position of slight overcorrection of the deformity. Therefore, the operative indications were to devise a procedure which would, if possible, fulfil the above requirements, and at the same time produce of itself as little bony shortening as possible.

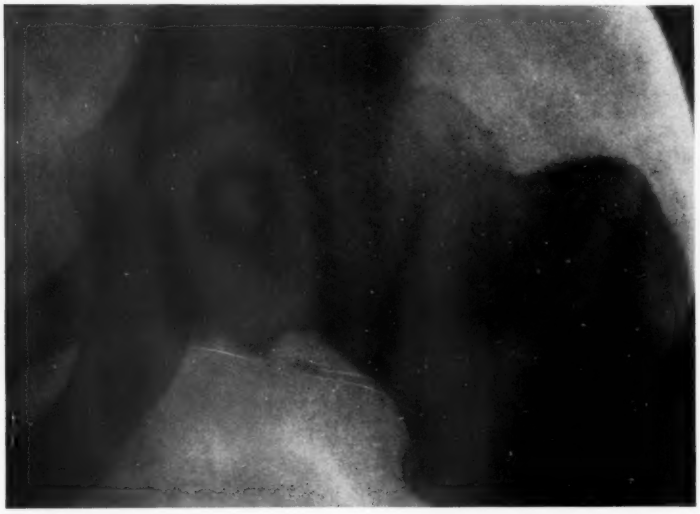
With the foregoing desiderata in mind, the following operation was executed:

The hip joint was reached by an anterior incision, five inches long, through skin and subcutaneous tissues, starting from just below

Case 2. Note the marked flattening of the head and the osteophytes above the digital fossa.

and inside of the anterior superior spine of the ilium and extended downward. The sartorius muscle was retracted outward. The deeper muscles and structures were separated by blunt dissection and the iliacus and the rectus femoris muscles were retracted inward. A part of an extensive ring of osteophytes about the acetabulum was turned upward with the soft tissues adherent to them, because it was thought wise to preserve as many as feasible, on account of their bone producing possibilities. In so thick a thigh, with the presence of so much bony outgrowth, it required some care to locate the joint definitely. With the head of the femur in situ, approximately one-half of its upper hemisphere was removed with a large chisel, through a plane nearly parallel with the long axis of the neck of the femur. Then with the same instrument, and a strong curette with a cross handle, the acetabulum was transformed into a flat-surfaced roof, against which the flat surface of the head was finally brought into firm contact by abduction of the thigh. Upon attempting further abduction, it was found impossible on account of the shortened adductor muscles. An open tenotomy of these muscles and tendons was found necessary before the leg could be brought into proper position. The acetabular and head surfaces were then brought into contact by simply abducting the thigh. The capsule and soft tissues were sutured.

Access to the joint was much facilitated by a position of extreme abduction of the limb. For purposes of orientation, an assistant was kept in constant readiness to rotate the femur, while the operation was going on. The bone was removed in such a way that the flat pelvic surface was tilted up mesially somewhat, in order to produce, in a way, a locking of the parts, and to prevent any possibility of dislocation from weight bearing. The leg was finally put up in a spica, from the axilla to the toes, in strong abduction and ten degrees of flexion. The convalescence was uneventful, and the patient was walking at the end of four weeks with the aid of crutches. A short spica was substituted for the long one at the end of five weeks. The patient walked at the end of nine weeks without the aid of crutches or cane. He went back to work as a patrolman in four months. The patient now states, two years and three months after the operation, that he has not suffered any pain whatever since he left the hospital, although he is at work continuously. The leg has remained extremely well in the corrected position, and only a fourth of an inch of extra leather has been



Case 3.

worn on the heel. His occupation since the operation vouches for his locomotive abilities. He has continued as a patrolman, working nine hours a day, and has not lost any time on account of his hip since he went back to work in September, 1907.

The following improvements in the technique have been carried out in the last ten cases, in addition to the operative steps already described:

The portion of the acetabulum, overhanging the femoral head, is thoroughly removed. This exposes the head and facilitates the removal of its upper part. With the head in situ, the upper half hemisphere is removed en masse, as described above. This fragment is then split at right angles to its cut surface with a small chisel or osteotome into segments, two-thirds of an inch in thickness. These extract with greater facility than the former irregular fragments. After the removal of the upper part of the head, the femur is strongly rotated outward, and all the cartilage that can be reached on the anterior aspect of the remaining portion of the head is removed with a chisel. Then the same instrument is inserted between the head and the acetabulum and the cartilage on the contiguous surface of the latter is destroyed as much as possible. In stout people one is forced to rely upon the sense of touch, almost exclusively, when removing bone. One precaution should be emphasized, and that is, not to be misled by the shell of the osteophytes, which often extends a considerable distance outward and downward from the rim of the acetabulum, and remove too much of the head. The tendency is always to think of the hip joint as situated lower than it is.

CASE 2. A. N. consulted the writer September 14, 1906. Before a question could be asked, the patient volunteered the diagnosis. He said that his right hip had been fractured fifteen years before. The following history was obtained: Age 30; always well. No trouble with joints before injury. Was struck on right hip with a stone the size of a goose egg, thrown by his brother, fifteen years before. Careful questioning brought out the fact that he walked home after the injury, and did not have any trouble in the hip for over a year. The first symptoms were stiffness, slowly increasing, until pain appeared about one year and a half ago. Since then, notwithstanding much treatment by many physicians, the symptoms have increased in severity until two months ago, when he was compelled to discontinue work. Sleep has been much interfered with on account of pain.

Physical examination. Pale and careworn. Walks with a marked right limp. No other joints involved. Actual shortening of right leg one-third of an inch. Practical shortening, one and one-half inches. Rotation and abduction of thigh much limited by pain and obstruction. Flexion to 100 degrees. Hyperextension much limited. Some spasm of muscle. Atrophy of

Case 4.

the limb was marked. The buttock was flaccid and flattened. A skiagraph showed the head much worn away and flattened, with many osteophytes about the rim of the acetabulum.

The patient was put to bed with traction of five pounds and the hip immobilized. The pain promptly disappeared, and at the end of two weeks a short spica was applied and the patient was allowed to go about with the aid of crutches. This was very annoying to patient, and he refused to wear the spica. A brace was advised, but was refused. Patient was not seen again for over a year. When he reported, he had been taking some injection treatment in hip, and was much worse, both in respect to pain and disability. He was admitted to the Post-Graduate Hospital, November 25, 1907, and was immediately operated. This patient at the present time is walking about without pain and has been to work for several months.

Case 3. M. G., 55 years old. Clerk in store. Consulted the writer December 15, 1907. Five years before patient fell, striking his back on sidewalk. Soon afterwards he noticed slight stiffness in right hip. He was never able to run since without a noticeable limp. There was little change until the fall of 1905, when a severe pain was experienced in hip, while patient stooped to pick up something. Since that time, the pain and disability were much worse. In January, 1906, he went South, but the hip became more painful while there. Three months after his return home, he was compelled to begin the use of crutches. Soon after this there was some improvement, but a cane was always used thereafter, and a constant dull ache in hip was always present.

Physical examination. Pale and rather poorly developed. Weight 150 pounds. Walks with a marked limp. Right leg much atrophied and somewhat permanently adducted and flexed. Flexion of thigh about one-third its normal arc. Abduction and rotation nearly absent. Hip sensitive to the limits of all passive motions. Actual shortening of right leg was one-half an inch. Practical shortening, one and one-fourth inches. A skiagraph showed that the head was much worn away, with some osteophytes about the rim of the acetabulum.

This patient was operated December 22, 1907. The convalescence was uneventful. The plaster-of-Paris spica was removed at the end of twelve weeks. The patient went back to work ten weeks after the operation. He has had no trouble with the hip since.

Case 4. T. J., 67 years old. Carpenter by trade. Never in bed on account of sickness. Gonorrhoea when 22 years of age, from which he has had no trouble in the past fifteen years. Present trouble with right hip began ten years ago. The first thing that the patient noticed was that his right hip began to be stiff when he stopped to pick up something or to lace his shoes. The hip from that time gradually became stiffer. As he put it, "the muscle seemed to contract." Three years ago the hip became painful. The pain has been worse during the day, but has also interfered with sleep a good deal at night. It has increased continuously since its beginning. The apparent shortening of the limb and the lameness have been marked during the past six months.

Physical examination. Careworn, and beyond his years in looks. Walks with a marked right limp. Right leg atrophied and adducted. Buttock flattened. All motions of hip, including rotation, much limited, especially abduction. Flexion was the least limited and was about one-third its normal amount. The hip was sensitive to the limits of all motions. Actual shortening five-eighths of an inch. Practical shortening, one and one-fourth inches.

This patient was admitted to the Post-Graduate Hospital (private floor), February 5, 1908. He was operated February 7th. The skiagraphic findings were confirmed. The head was much worn away and there were many osteophytes. As in the previous cases, there was practically no post-operative shock. The convalescence was uneventful. Four weeks after the operation, he was shown to the Interurban Orthopedic Club, and at that time he was wearing a short spica and walking with the aid of crutches. He could stand on the operated leg without pain. Two months after the operation, he wrote to his nephew that he was walking about with comfort, and that occasionally the entire weight of the body upon the operated limb produced a twinge of pain, but that he was free from pain at all other times. November 12, 1908, he again reported by letter that he was working on a farm in Pennsylvania, and that his hip was strong and had not troubled him for a long time.

CASE 5. J. K. Referred to the writer by Dr. A. W. Hollis, of New York. A previously active business man, 63 years of age. Past history negative. Twelve years ago, a sidewalk over which patient was walking broke, letting his right foot through. The right hip received a "severe jar." Soon after this, he began to have pain in the knee and thigh, especially while walking. Ten years ago, he began also to have pain in the region of the right sciatic nerve. This has also gradually increased in severity. Three years ago a severe pain began just posterior to the hip joint. This continued to increase until for the past three months the patient was practically confined to his chair or bed. He lost interest in things and refused to go about, and retired from business.

Physical examination. Very large. Height 5 feet, 11 inches. Weight 220 pounds. Right thigh much atrophied and adducted. Walked with difficulty, hopping along as if it was very painful. Flexion limited to about two-thirds its normal arc. Abduction and rotation nearly absent. Limb adducted. Actual shortening three-eighths of an inch. Practical shortening, one and one-half inches. Joint sensitive to the extreme of motion. Patient locates most severe pain as just posterior and internal to the hip joint. He was admitted to St. Luke's Hospital, Private Pavilion, by the kindness of Dr. Lyle. The operation was done February 20, 1908. The head had slipped up on the rim of the acetabulum and was apparently progressing toward a complete dislocation. There were many osteophytes and much disorganization of the joint.

The convalescence was uneventful. This wound, as well as all the others, healed by primary union. The patient was walking with the aid of crutches at the end of four weeks, and could place his whole weight upon the operated leg without pain. The spica was changed to a short one at the end of five weeks. It was removed at the end of eleven weeks. This patient was seen June 1, 1908, when he stated that he had not experienced a twinge of pain in his hip since the operation. His family stated that he had undergone a great change mentally since relieved of his constant pain, and that he was much more cheerful than formerly.

In a letter, January 12, 1909, the patient states: "I am very much pleased to be able to report that the operation has been a wonderful success. All pain has left me, and you may remember that I was very anxious about my right knee joint, which has pained me so many years and I feared might have become chronic, but now this knee is as strong as the other, and entirely free from pain. I can walk all day if necessary. The result from the freedom from pain allows me to attend to my business and I feel at least twenty years younger."

CASE 6. M. H., female, 45 years of age, was admitted to the Post-Graduate Hospital and operated August 7, 1908. This proved to be an advanced case, and the joint was much disorganized, with a marked flexion-adduction deformity. The wound healed by primary union and the convalescence was uneventful for the first seven weeks. When I went away on my vacation September 7th, she had been about the ward on crutches for ten days and was planning to go home within a few days. Soon after this she began to have a temperature. Medical consultation made a diagnosis of pneumonia and chronic diffuse nephritis. She showed very little resistance, became delirious, and died in about ten days. The autopsy showed a collection of pus near the hip joint. The report of the urine before the operation was negative, but directly afterwards albumin and casts appeared, varying in amounts, but persisting. Diagnosis of pathologist, chronic diffuse nephritis.

Case 7. Note bend in the femoral shaft at the point of the former Gant's osteotomy.

CASE 7. Miss B. Eighteen years of age. Was admitted to the Post-Graduate Hospital, August, 1907, and a diagnosis of ankylosis, with flexion-adduction deformity following tuberculosis was made, and a Gant's osteotomy, with correction of the deformity, was done. The immediate convalescence was uneventful, but when the patient began to walk, weight bearing produced pain, and a short spica with crutches was instituted again, but to no avail. An X-ray one year after the operation showed the bones well united at point of operation, but there was slight motion at the hip joint, indicating that the ankylosis was fibrous and not bony, as was supposed, which, by the way, is very likely to be the case in tubercular infection, and accounts for the frequent relapse of a deformity after a trochanteric osteotomy. In this case then, we had an analogous problem to that of a knee joint in a similar

Case 10.

condition with its contingent joint strain, the universal treatment of which is an excision for ankylosis. After palliative treatment for one year and ten months, without relief, a partial arthrectomy, as described herein, was done June 1, 1908. The hip was found much disintegrated, but the ankylosis was fibrous. The convalescence, in a neurotic girl, has been uneventful, and a firm bony ankylosis has been secured.

CASE 8. E. A., laborer, 38 years of age. Admitted to the Post-Graduate Hospital, August 20, 1908. Family and previous history negative. One year ago began to have pain in posterior part of the left thigh, groin, and knee. Pain increased to such a degree in two months that he was confined in bed for one month. Since that time the pain was continuous but intermittent in its severity. There was one-fourth inch shortening, considerable flexion, and adduction. Pain and much spasm produced by passive motion. Motion limited, equally in all directions, by spasm. Patient objected strongly to braces or spicas, and stated that he had a large dependent family. A partial arthrectomy was done August 21, 1908. He was discharged from the hospital October 24, 1908, in a short spica, which he immediately cut off, and objected to its being replaced. Nevertheless, the limb has remained in good position, and there is apparently firm ankylosis. I wish, however, to state here that this treatment should be recommended for very carefully selected cases of tubercular hip disease, and in adults only.

CASE 9. A. S., adult female, 29 years of age. Was kindly referred to the writer by Dr. R. A. Hibbs, of New York City. History negative except for present illness. Began to have pain and stiffness in left hip fourteen years ago. Etiology unknown. Disability and pain increased, until two years ago, when it became much more severe both night and day. Has had to use crutches and one and one-half inches of cork extension on left shoe for the past two years.

In the past six years, this patient has been discharged as incurable from two hospitals, and has been under treatment without relief in either the wards or dispensaries of the following hospitals: The New York Hospital, The Post-Graduate Hospital, Christ Hospital in Jersey City, Roosevelt Hospital, The Hospital for

Case 11. Note the extreme wearing away of the head in an oblique plane. In this case the portion of the head was removed through a plane at more of an angle with the femoral neck, on account of the obliquity of the head.

the Ruptured and Crippled, and the Vanderbilt Clinic.

Physical examination was negative, except left hip. Walks only with the aid of crutches. Wears one and one-half inch extension on left shoe. The left leg is markedly adducted and flexed about forty degrees. The actual shortening is one-third of an inch, and the practical shortening two and one-half inches. All motions absent except about ten degrees of flexion. All attempts at passive motion elicit severe pain. An X-ray examination revealed many osteophytes, and the head much flattened.

This patient was admitted to the Hospital for the Ruptured and Crippled, where the writer operated February 23, 1909. The convalescence has been uneventful and all pain and discomfort have disappeared. The disability is much relieved and patient walks without the aid of crutch or cane.

Case 10. L. C., adult male, 28 years of age. Plasterer by trade. Venereal history negative. For several years has had pain in left hip. Etiology unknown. Two years and a half ago was treated for rheumatism of this hip. Later, wore plaster-of-Paris spica without relief. For the past year, the pain and stiffness have increased rapidly. Has not been able to work for the past six months.

Physical examination negative, except for left lower extremity. Walks with difficulty and much pain. Limb permanently adducted five degrees and flexed thirty degrees. All motion much limited, especially rotation and abduction. There are about thirty degrees of flexion, obliquely outward. The extremes of all motion cause pain. The actual shortening is one-fourth of an inch. The practical shortening is one-half of an inch. A skiagram showed osteophytes and a flattened head.

This patient was admitted to the Post-Graduate Hospital and operated February 26, 1909. He was discharged April 15, 1909, and at that time there was slight motion at the hip, which caused some pain from weight bearing. A month later, firm ankylosis had occurred and the pain, when walking, had entirely disappeared. At this writing, the patient is back to work, and is much pleased with the result.

Case 11. E. E., male, 28 years of age. A silver burnisher by trade. Duration of progressive pain and stiffness in right hip ten years. No history of injury. The pain is more severe the past two years, especially at night. The past year he has been much crippled. Has worn a cork extension of two and one-fourth inches the past three years.

Physical examination negative, except for the right

Case 14.

limb. Patient stands with foot raised from the floor, on account of the presence of extreme adduction and about thirty degrees of permanent flexion. The limb is markedly atrophied. All motion practically absent, except about ten degrees of flexion. Attempts at passive motion produce pain. An X-ray examination revealed osteophytes and a much flattened head.

This patient was under the usual palliative treatment for a year without relief. He was admitted to the Post-Graduate Hospital and operated June 17, 1909. The operation was witnessed by several members of the American Orthopedic Association. The convalescence has been uneventful thus far.

CASE 12. M. P., male, 22 years of age. History negative until the beginning of the present illness. Four years ago he began to have pain and stiffness in the right hip. This gradually increased with the associated disability, until three months ago, when the pain became much more severe and he could not move about without great discomfort.

Physical examination negative, except for the right limb. Patient walks with marked right limp. All motion much limited, especially rotation and abduction. There is motion of twenty degrees of flexion. Limb permanently adducted five degrees and flexed ten degrees. All attempts at passive motion elicit pain. The actual shortening is one-fourth of an inch, and the practical, one inch. An X-ray examination showed many large osteophytes about the acetabulum and the head much flattened.

This patient was admitted to the Post-Graduate Hospital and operated upon July 16, 1909. The convalescence has been uneventful.

CASE 13. T. W., male, laborer, 60 years of age. Family history negative. Personal history negative. In November, 1908, had a severe fall striking on right knee. The force of the fall was transmitted to the right hip. Pain and stiffness have gradually increased ever since. Has not been able to work the past nine months and has had to use crutches or cane during this time.

The physical examination is negative except for the right hip. He walks with a marked limp and only with the aid of a cane. Foot much everted and leg considerably atrophied. There are slight adduction and flexion. Rotation and abduction nearly absent. Flexion to about sixty degrees, associated with marked muscular spasm. The actual shortening is one-fourth of an inch. Practical, one-half. An X-ray examination revealed many osteophytes about the hip and the femoral head considerably flattened. The convalescence has been uneventful thus far, after having been operated at the Post-Graduate Hospital on August 4, 1909.

CASE 14. B. C., male, 22 years old. History negative, except right hip. When patient was six months old he had a severe trouble with the right hip, which was pronounced by his physicians tubercular hip disease. He was under treatment with braces, plaster-of-Paris spicas, high shoe, and crutches continuously, until he was nine years old. Thigh has been drawn up ever since he can remember. For past ten years has worn three and one-half inches of cork extension on right shoe. Has been quite free from pain until five or six weeks ago, when he began to have pain in hip while walking. No pain at night. Health otherwise good.

Physical examination. There are three and one-half inches of cork extension on right shoe. Patient walks very poorly with toe turned in and marked limp. Right trochanter is very prominent and above Nelaton's line. Right limb is extremely atrophied and poorly developed. Marked permanent adduction and about forty degrees of flexion. All motion at hip joint is absent except for about five degrees of flexion, associated with pain and muscular spasms. The actual shortening is seven-eighths of an inch. Practical shortening is three and three-fourths inches. An X-ray examination showed the head somewhat worn away and very large osteophytes at the upper part of rim of acetabulum. A diagnosis was made of an old tubercular hip with a complication of osteoarthritis. The herein described operation was chosen instead of Gant's osteotomy, because of motion at the hip and its associated joint strain, and liability of a relapse of the deformity after the former operation. This patient was admitted to the Post-Graduate Hospital August 5, 1909, and immediately put to bed with ten pounds extension, with the hope of stretching down some of the enormous adduction. August 6th, he was anæsthetized and the hip stretched. The join was then reached by the usual route, and about one-third to

one-half of the head was removed. A larger portion than formerly was removed on account of the marked adductor contractures. However, even then, sufficient abduction could not be secured, and an extensive open myotenotomy of the adductors was done. The limb was then put up in a long spica in very good position, i. e., ten degrees of flexion and abduction. The convalescence thus far has been uneventful.[1]

The writer believes that the field of this procedure should be extended to include besides the above mentioned cases of advanced arthritis deformans, certain selected cases, such as extreme paralysis of both hips and the lumbar spine (dangle hips), associated with marked lordosis, where contractures of the fascia lata occur and recur. Here the ankylosing of one hip holds the pelvis upright, corrects the lordosis and makes bracing much easier.

Second: Dislocations following suppurative arthritis of infancy, where the head of the femur has become disorganized and has disappeared. In this event, the great trochanter should be mortised into the acetabulum.

Third: As a substitute for Gant's subtrochanteric osteotomy in cases of fibrous ankylosis, where mobilization is not feasible. This precludes two disagreeable sequences of Gant's osteotomy, namely, joint strain, and relapse of the old deformity, by a slowly giving way or stretching of the fibrous ankylosis. In other words, it is treating the hip as the knee joint has been treated, under similar conditions, for years.

Fourth: I believe it has a place in the treatment of select cases of tubercular ostitis of the hip in adults, and I would again refer to the accepted views as to the application of an excision to the knee joint, as a guide in the selection of these cases. It should, however, be noted that this procedure is somewhat more permissible in older children than an excision of the knee, (1) because a very little of the epiphyseal cartilage is removed, and (2) much less growth occurs here normally than at the lower end of the femur.

The above described operation, in the light of the sixteen cases herein reported, has the following advantages:

First: It assures bony union by bringing two large bony surfaces into close apposition and holds them there firmly by the mere correction of the deformity, if one exists, thus eliminating all possibility of a painful joint or a recurrence of the deformity, either of which are probabilities in the event of an operation for mobility. Further, the stiff hip, in the position of fifteen degrees of flexion, with the compensatory movement of the lumbar spine, has proved of very slight annoyance in every case.

It should be noted here that the distance between the horizontal planes passing through the upper part of the hip joints and the intervertebral cartilage between the sacrum and the last lumbar vertebra, is approximately only two and one-fourth inches; hence the satisfactory compensatory mobility of lumbar spine.

Second: It produces a minimum amount of bony shortening, which is compensated for, as well as that already existing, by the fixed abduction of the limb.

Third: It involves very little cutting of soft tissues and does not require the dislocation of the head from its socket, and thus produces very little post-operative shock, even in old people.

Fourth: A dislocation or displacement of the femur is extremely unlikely, even from weight bearing, immediately after the operation. Therefore, aged patients can be gotten out of bed very early.

[1] The additional cases will not be given in detail. They were both advanced osteo-arthritis of the usual type and were forty-two and fifty five years of age. Their convalescence has been uneventful. The results are extremely satisfactory. Their pain has entirely disappeared.

CONCERNING THE FERMENT AND ANTIFERMENT TREATMENT OF SUPPURATIVE PROCESSES [1]

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DURING the past year, I, together with A. Peiser, made at the thirty-seventh congress of the German Surgical Society, the first communication concerning a new form of physiological therapy of suppurative processes, which, both theoretically and experimentally, is well grounded, and with proper indications can lead to surprising practical results.

It is the so-called ferment and antiferment treatment. The end result of this therapeutic endeavor is produced by the changing relation between the albumen dissolving enzyme, which even normally is contained in the polynuclear white blood corpuscles and the antibody, which, as an antiferment to this proteolytic leucocyte ferment, circulates in the blood serum and also passes out into certain pathological exudates, especially into certain fluids obtained by aspiration from the pleural and peritoneal cavities.

We have demonstrated this antagonistic play between ferment and antiferment, which, on account of their marked biological differences, so-called cold, clear, tuberculous pus and so-called ardent, acute, inflammatory coccus pus show on the serum plate. A simple experiment to illustrate albumen dissolving ferment consists, namely, in that one places small drops or particles of the material to be tested on a so-called Loeffler's or serum albumen plate and incubates the latter at a temperature of 55° to 60° C. Deep excavations appear in the serum plate when the excretory material contains a ferment which is capable of dissolving coagulated blood serum. In the absence of such a contained ferment cavity formation fails to appear. Now "ardent pus" produces on such a serum plate deep cavities; not, however, by means of the bacteria which it contains. On the other hand, cold pus simply dries out on the unchanged surface of the serum. The pus corpuscles of the ardent pus are, of course, polynucleated neutrophilic leucocytes, and therefore ferment carriers. The cold, clear, tuberculous pus consists, on the other hand, mainly of detritus and lymphocytic elements which seem to contain no ferment. Every secondary infection, however, causes the cold pus to contain ferment and, therefore, in a certain measure to become ardent. The ferment carriers are here also immigrated polynuclear leucocytes through the disintegration of which the enzyme becomes free and active.

Its action can, however, become weakened or prevented by the thermolabile antibody, the antiferment. Indeed, for example, the addition of an equal quantity of richly albuminous ascitic fluid, can occasionally, even in dilutions of many hundred fold, promptly inhibit entirely the action of digesting coccus pus.

I have previously emphasized further that the polynuclear leucocytes, as ferment carriers, not only lead to excavations on such serum plates; they lead also to destruction of albumen in the pus cavity itself. The albumen destruction must, on account of the lack of an adequate amount of proteolytic ferment, be proportionately very slight in pure tuberculous processes. On the other hand, it must be very great in acute inflammatory and ardent suppurations, on account of their richness in enzyme.

The fermentative destruction of albumen is, however, not only the most important preliminary process in resorption: it is also the cause of the so-called suppurative tissue dissolution, which in reality is a purely chemical process. With this point in view I have endeavored, by addition of ferment, to make enzyme-poor tuberculous exudate capable of resorption and by addition of antiferment to diminish in ardent pus an excessively rapid

[1] A report given before the Surgical Section of the International Congress held at Budapest, 1909. Translated by R. C. Menzies, M. D., Assistant in Surgery, Northwestern University Medical School.

absorption of toxic products of metabolism and a too extensive tissue dissolution.

The ferment treatment of cold pus was previously known. The curative action of the iodoform glycerine injection depends indeed on the fact that the iodoform has a chemotactic action. Through the albumen dissolving ferment of immigrated and disintegrated leucocytes the albumen becomes dissolved and capable of resorption, while with untreated, closed, pure tuberculous processes as has been already mentioned, all proteolytic ferment action on serum plates is absent, yet there can also occur with pure tuberculous processes unmistakable digestive phenomena (viz., cavity formation) when the process is under the influence of iodoform glycerine treatment. In contrast to this known indirect ferment treatment I endeavored to inject pure ferment solution, but without being able to report practical results.

This direct ferment treatment of tuberculous processes has at a later date and independently of me been investigated with great success by Jochmann and Baetzner in Bier's clinic. They employed for this purpose not the difficultly obtainable proteolytic leucocyte ferment, but the biologically apparently equally valuable pancreas trypsin, in a solution of about one per cent. About one to two cc. of this solution are injected as a rule, repeatedly and at varying intervals of time, according to the usual method of injection treatment, into the tuberculous cavity.

The abscess content under this treatment changes gradually in color and consistency. In the first place, owing to disintegration of the formed pus elements, it becomes more fluid. Of more importance than all else, however, there soon springs from the periphery, toward the center, a vigorous wall of fresh live granulation tissue.

In this manner the abscess cavity is gradually filled in and brought to scar formation; apparently the injected trypsin ferment is capable of attacking and digesting the weakened tuberculous granulations. The healthy granulation tissue is, on the other hand, in consequence of its adequate content of antiferment, protected from heterolytic digestion and at the same time through irritation from the injection and through removal of the previous inhibition, accompanied as it is by favorable local hyperæmia, it is made stronger and incited to vigorous development.

Also the injection into actively suppurating fistulæ and the swabbing of ulcerated open surfaces with the ferment solution proved practical therapeutic procedures. Tendon sheath hygroma. which without previous puncture are treated with the injection of ferment. soon become smaller and as the only sequence there remains behind a leathery infiltration of the sheath wall.

Whether this direct treatment of tuberculous processes is always preferable rather than the indirect by means of chemotactic agents, for example, by means of iodoform glycerine, further experience must decide. Against the injection of solutions of the ordinary digestive trypsin one may for example argue, that these commercial preparations are not at all sterile. The manner in which they are obtained involves the possibility of contamination with dangerous infectious bacteria, especially tetanus. In my opinion one is justified in injecting such a trypsin solution into a cold abscess only on condition that there has been a careful removal of bacteria by means of a germ proof filter. Even greater protection against tetanus is afforded by the trypsin solution (Merck) now used by us in Marburg, which is obtained under strict aseptic precautions from the pancreatic glands of animals.

The domain of this ferment therapy is, of course, on both theoretical and experimental grounds, tuberculous processes; yet it may be of value also in other local pathological lesions, especially in softening up diphtheritic membranes. The use of pyocyanase is a form of ferment therapy. One great advantage of this pyocyanase obtained by fluid culture of the bacillus pyocyaneus should lie in its possession of an albumen dissolving ferment shown by its proteolytic power of dissolving membranes.

The main point in a physiological therapy, hence in a nature cure of suppurative processes, lies not alone in the fact that one employs to the utmost and when possible even increases the natural curative and protective powers of the human organism. It lies also in the fact that we limit single, especially fermentative

resistance endeavors to a suitable and permissible degree and thereby curb the blind zeal of nature in her attempt at protection. The cold, sterile, tuberculous area is entirely too lacking in ferment. It requires therefore, for resorption and healing the artificial addition of ferment. On the contrary, in ardent suppurative processes there is an excess usually in the amount of pus secretion and in the amount of pus fermentative tissue dissolution. Against its albumen dissolving ferment: hence against self-digestion in the broader sense, the body protects itself normally by means of its antiferment. The addition of antiferment to the ardent pus area oversupplied as it is with enzyme is from this viewpoint therefore, the most natural and logical therapy. Artificial addition of antiferment to ardent pus causes it in a certain measure to cool. The excessively active destruction of albumen through the proteolytic leucocyte ferment is limited. In consequence the body tissue, immediately bordering and damaged in its vitality is protected from fermentative softening, or in other words from digestion by the pus. In this way one is able most successfully to combat the occurrence of serious functional defects through wide extension of the tissue necrosis, and in like manner the perforation of pus into inner organs and general septic infection.

Moreover the artificial addition of antiferment must favorably influence the metabolic interchange between the pus area and the body. It must hinder the too quick and too extensive resorption of the excessively toxic products of albumen dissolution which occurs through the autolysis of the pus corpuscles themselves, through the fermentative dissolution of the necrotic body tissue, and last but not least, through the heterolytic digestion of the dead bacteria with production of so-called bacterial protein. Through it an easily imagined general intoxication of the body is best prevented and in addition the ferment fever (pus fever), caused as it is by resorption of toxic products of metabolism, must fall. Finally the limitation of excessive pus secretion and above all, the augmentation of the protective power of the leucocytes, must go hand in hand with the protection of the tissue and the diminution of resorption. In other words the enzyme containing leucocytes which normally circulate in blood serum rich in antiferment quickly undergo disintegration in the pus serum overloaded with ferment, hence in the products of their own metabolism.

Thus addition of antiferment protects the vitality of the leucocytes and preserves for the body one of its most effective weapons against bacterial infection. Such an artificial increase in the supply of antiferment belongs indeed to the healing factors of Bier's hyperæmia. A far more productive action must, however, result in circumscribed suppurations from direct flushing with fluids of high antiferment content. Such fluids are, first of all, human blood serum and certain aspiration fluids, especially from the pleural and peritoneal cavities. Now such solutions of antiferment contain not only the antitryptic substance which is necessary first of all. They contain also nearly all the other nourishing and protective substances which a tissue injured by bacterial suppuration requires for its defense. Wright's assertion that at the point of infection the concentration of protective material is diminished holds good apparently for suppurative processes and the thermolabile protective material. Above all the leucocytes in excessive amounts seem to inactivate opsonin (Böhme). When, therefore, in suppurative exudates the abscess content actually becomes lacking in normal protective serum nothing better can be done than, after removing the pus as thoroughly as possible, to introduce new protective serum. This is accomplished either through of a serous transudate into the pus cavity, an action brought about by the marked impairment of the circulation of the tissue fluids in consequence of the inflammatory changes in the vessels, or, still better, through direct artificial introduction into the abscess cavity of large amounts of blood serum and other aspiration fluids rich in antiferment. Thereby we produce immediately a local mass action of our protective force and at the same time the adequate addition of cell nutrient material necessary for the resisting ability of the cells.

As a therapeutic aid the blood serum was employed indeed by Metchnikoff. He used it locally in order to increase phagocytosis.

Hort in England has seen excellent results from similar local application of serum to ulcerative processes. Apparently, however, Hort reported results only from normal serum, that is, from serum normal in the sense that that of the patient does not contain sufficient "antipower" to hinder the autolytic processes accompanying suppurations. In his communication Hort also confirmed the result of the investigation carried out here in the Strimpel clinic by Wiens at my instigation. Wiens had made the first systematic study of the fluctuations of the antiproteolytic power of human blood serum in pathological conditions.

Then after Brieger and his co-workers, in verification and extension of our investigations and in application of our plate experiences, attached a certain diagnostic importance to the increase of the inhibitory power of the blood serum in carcinoma, there accumulated in a very short time a quite extensive literature dealing with this subject. The most important and indeed the only sufficiently verified results of these studies are briefly as follows: (1) The inhibitory power of the human blood serum corresponds in activity to the activity of pancreas-trypsin and of the albumen dissolving leucocyte-ferment. (2) These same antitryptic ferments control, for example during pregnancy, the chorion trypsin elaborated by the young chorionic villi. (3) That we have to deal with several proteolytic ferments and that we must reckon not alone with primary fluctuations in the ferment production, for example, with increased and decreased destruction of leucocytes, but also with primary fluctuations in the content of antiferment; and finally (4) with the fact that the body answers to every increased addition of ferment with a reactive increase in its content of antiferment, so that without further evidence it is clear that the fluctuations in the inhibitory power within the range of the normal and pathological can be produced by widely differing causes.

Concerning the normal fluctuations in the inhibitory power of the blood serum, which apart from pregnancy and labor are apparently only relatively slight, we know much less than we do concerning the changes in the fractional inhibition in pathological conditions. In most chronic and in practically all acute febrile affections the fractional inhibition in the human is influenced first of all by the proteolytic leucocyte ferment. In those acute febrile conditions which are accompanied by a leucocytosis, the increased destruction of ferment containing leucocytes can lead to a transient diminution of the inhibitory power at the height of the disease, and later to a timely reactive increase. On the other hand, in chronic diseases we must reckon with an increase of the inhibitory power as the result of a more prolonged though no less great increase of the ferment production, and a reactive immunizing increase of the amount of antiferment. And this indeed, is the fact. With the exception of diabetes mellitus, practically all of the more chronic diseases which are associated with serious general damage to the system, lead to an increase in the inhibitory power. This holds good also, though not without exception, for the majority of patients with carcinomata. In a given case, however, no great diagnostic conclusions can be drawn from this fact. One finds such an increase to a certain degree as an individual peculiarity, occasionally indeed in healthy persons, and quite regularly, as has been already mentioned, in other chronic diseases, for example, in severe cases of tuberculosis and Basedow's disease, in some severe cases of anæmia, and above all in most of the subacute and chronic septic suppurations.

The most that one can say, therefore, at least according to my experience, is that with a suspicion of otherwise uncomplicated malignant disease, especially of the gastro-intestinal tract, a normal or still more a markedly diminished concentration of the inhibitory power points to that diagnostic conclusion which speaks against the anæmia of carcinoma. A review of the investigations attempting to explain this increase of the antiferment content in malignant diseases lies outside the scope of my report. This increase I will say briefly is in no way a simple increase of inanition. The raised inhibitory power of the blood serum is in reality more the consequence of a chronic overproduction of proteolytic leucocyte ferment, and in consequence, a reactive immunizing increase of the antifer-

ment content. Only those carcinomatous patients who are cachectic have as a rule a distinct increase of the fractional inhibition. The cachexia, however, according to all clinical experience runs in the main parallel to the ulceration of the malignant tumor. The tissue destruction of the ulceration gives rise therefore in reality to the proteolytic leucocyte ferment. In my opinion there does not exist a special proteolytic carcinoma ferment. The carcinoma cells (as has been recently verified by Hess and Saxl in a late report) in regard to their ferment content react exactly like normal epithelial tissue. The cancer tissue has no special heterolytic enzyme, or in other words, no enzyme which digests the albumen of other organs. It obtains its heterolytic peculiarity only secondarily through the immigration of ferment carriers, that is, of neutrophilic leucocytes.

Be that as it may, the fluctuations in the inhibitory power of human blood serum under pathological conditions are in no wise of such a nature that they require in antiferment treatment the employment of normal serum. In acute suppurations the diminution of inhibitory power is as a rule unimportant. Frequently, indeed, there can even be recognized in subacute processes a favorable reactive increase in the content of antiferment. One can, therefore, in case other material is not at hand treat the patient with his own blood serum after venous aspiration of at most 100 to 200 cc. Whereas, therefore, Bier, through hyperæmia in a certain measure concentrated the protective power of the blood at the point of suppuration, we in employing the antiferment draw off the blood serum from a distant part of the body, through a venesection which is perhaps even in itself favorable, and introduce it, with production of a transitory mass action, artificially into the area of suppuration.

Such a venous aspiration is, however, especially in the presence of septic wounds, a proceeding to which patient and physician do not willingly resort. Moreover, the necessarily rapid and complete defibrination of the aspirated blood is not always an entirely simple matter at the bedside. We have ourselves therefore, made use therapeutically of our experimental experience that the antiferment passes out in large amount into certain human aspiration fluids, and from at first and exclusively, and indeed with very gratifying results, have treated our patients with alien aspiration fluids, from the pleural and peritoneal cavities. The therapeutic value of these fluids is all the greater because of the fact that their development in infections of serous membranes represents a curative attempt of the system and in a way a natural antiferment therapy.

Indeed, we have to thank only the rapid development of a richly albuminous and therefore powerfully inhibitory inflammatory exudate, when in spite of infection of the serous cavities with virulent bacteria the body comes out victorious and the dangerous surface suppuration is checked. Thus nature is here also our teacher.

For such an antiferment therapy there can be used in the first place from the pleural and peritoneal cavities, human aspiration fluids of an inhibitory power which equals or exceeds that of the normal human blood serum. The important considerations in choosing these fluids are briefly as follows: The differences in the content of antiferment and therefore in the inhibitory power of such aspiration fluids are explained by differences in the amount of contained albumen and by variations in the participation of the polynuclear leucocytes in the pathological process.

One can say in general, that the greater the albumen content of an aspiration fluid and at the same time the less the participation of the ferment containing polynuclear leucocytes in the pathological process, especially the less the disintegration of leucocytes, the greater is as a rule the inhibitory power. Through this fact is explained no doubt the surprising differences which one finds in methodical investigations of the ferment and antiferment content of aspiration fluids. An excess of free proteolytic leucocyte ferment in pleural and peritoneal fluids occurs only in those exudates which are the result of acute suppurative inflammation. In this condition there occurs a disintegration of such masses of leucocytes that after complete neutralization of the inhibitory material which is at the same time present, there remains an active excess of free

proteolytic ferment. A fractional inhibition which approaches that of the blood serum occurs on the other hand only in richly albuminous transudates and in certain exudates usually those resulting from tubercle bacilli and from other non-bacterial, that is, from not more bacterial chronic inflammations.

This antiferment therapy with alien human aspiration fluids carries with it, no doubt, important considerations. First of all, there is the possibility of transference of disease and thus always the disqualification of adequate amounts of a highly active human antiferment serum. Every transference of disease can indeed be prevented if one, after rejecting syphilitics gives preference to those aspiration fluids which are sterile in the first place and renders absolutely germ free every antiferment serum, not merely those which are recognizably infected, by passing them through a bacteria proof porcelain or clay filter. As a matter of fact, a really harmful associated action has apparently up to now been avoided. On the other hand, the elimination of immigrated bacteria through such a bacterial filter requires great care aside from the operative precautions. Moreover it does not entirely exclude the possibility of certain, although hardly more dangerous, injuries through unorganized toxic products of metabolism which are soluble in human aspiration fluids. By far greater difficulties, however, are encountered in the handling of large amounts of good, human antiferment serum. Certain aspiration fluids which can be made to retain their activity for a long time through being kept in the ice-box and through additions of preservatives, especially of small amounts of phenol, stand always at the service of large hospitals and clinics. For the surgeon hydrocele fluid is still most available. This hydrocele fluid, however, does not at all as a rule meet the requirements of a good antiferment serum, so that we have used it as a rule only in case of necessity and as an irrigation fluid preparatory to the use of a highly active serum, hence in a way as an adjunct serum. Only when the inhibitory power of the hydrocele fluid equals that of the normal human blood serum is it of full therapeutic value.

Certain unsatisfactory results with hydrocele fluid and similar material can therefore be blamed upon the antiferment therapy only when the presence of a sufficiently high antitrypsin content is proven by previous thorough determination of the inhibitory power.

On account of these difficulties in obtaining and in preserving ready for use sufficient quantities of sterile and strongly inhibitory aspiration fluids, the general use of the antiferment therapy can naturally be an entire failure not only in general practice but also in other special branches, for example, in gynecology and ophthalmology in which it has also been employed. We must demand, of course, of a good remedy that in addition to the exclusion of disease transmission it shall stand ready for use in sufficient quantity at all times and in all places. Only through the use of animal blood serum rich in antiferment could this aim be accomplished and thereby the general employment of this new curative method be insured. The blood serum of most of the mammals has, however, a much smaller inhibitory power against pus ferment than that of the human. It is therefore not in its natural state available for efficient antiferment therapy. Nevertheless the commercial preparation of a highly active animal antiferment serum is quite possible. In other words, repeated artificial injections of ferment produce a reactive increase of the antiferment content of the blood serum in animals Thus through systematic immunization of horses against human pus ferment, which was obtained from large quantities of ardent pus, we were enabled to obtain an animal antiferment serum of high inhibitory power. This immunization of animals through systematic injection of human pus ferment is however not very practical. In the first place the handling of large quantities of pus is hardly possible. Besides, this human pus in spite of all the chemical changes which it undergoes in the course of time is a rather disagreeable excretion. Now, therefore, since it has been shown that the inhibitory power of the blood serum against pancreas trypsin increases, and vice versa parallel with the fractional inhibition against pus ferment, it is indisputably possible for the animal antiferment serum known as "leukofermantin" to be obtained through immunization with

pancreas trypsin. Moreover, only the employment of such a commercially supplied, highly active antiferment serum of always constant inhibitory power makes it possible to secure satisfactorally comparable results in long series of investigations and in different clinics and hospitals.

I must not conceal the fact that the use of a highly active animal antiferment serum involves also certain considerations. With a high surrounding temperature its inhibitory power can after weeks and months become markedly weakened through autolytic processes which are in nowise checked by the addition of phenol. The antiferment serum should therefore be not too old and should be kept in the refrigerator. Further, human blood serum and human aspiration fluids rich in antiferment contain practically all of those nourishing and protective substances with which our body defends itself against bacterial infection. One can speculate over the question as to whether these associated activities are very essential and whether they pertain to animal blood serum in a measure approaching that in which they pertain to suitable human aspiration fluids. As a matter of fact, in the joint investigations with Peiser in Küttner's clinic I convinced myself beyond a doubt that the antiferment content really plays the most important role. The best and most uniform curative results can be obtained only through the employment of highly active sera.

The contention is not tenable that such antiferment solutions are perverted in the abscess cavity into a superior culture material for the disease producing organisms. This is true only of the serum which is coagulated and changed by heat. Otherwise such antiferment solutions bear unharmed in their activity the addition of disinfecting substances, especially phenol. Besides this the fresh unchanged serum contains antibacterial protective substances and finally, according to Metschinkoff, it incites the leucocytes to active phagocytosis.

It cannot be within the province of an internist to prescribe to you as surgeons the special indications and methods of application of this antiferment therapy. As an internist I must rest the main portion of my communication in a discussion of the theoretical and experimental ground work. Only to this length am I entitled to my own opinion. In regard to practical experience I must content myself with a very short report of the matter which has been rendered by my earlier co-worker Peiser, and later by Kolaczek, Hagen, Baetzner, Goebel, Fuchs, Lenz, Kantorowicz, and others.

One fact of right weighty importance for the recommendation of a new therapeutic measure has been established beyond doubt — namely, that, apart from occasional harmless serum exanthemata, pernicious results from this antiferment treatment have up to the present time never been encountered. On the other hand the curative effect in all ardent suppurative processes which lead to abscess formation was almost without exception very gratifying. These circumscribed suppurations with sharply marked boundaries are therefore the domain of the antiferment treatment. In these cases the curative results have uniformly borne out practically what was promised theoretically. After exhibition of antiferment the wound healing assumes an entirely changed and in a way a healthy character. With a fall in temperature and a quick recession of the œdema there ensues a speedy cessation of the softening which has begun, and through the formation of fresh healthy granulation tissue comes a most rapid demarcation of the tissue necrosis. As especially characteristic of the antiferment therapy, my surgical co-worker, Peiser, has called attention to the beautiful picture of the quick sharp demarcation. Even after a single day, Peiser has often been able to remove from a fresh, clean, active red bed of granulations the whole mass of entirely fluid pus drops and portions of tissue already necrotic and therefore inevitably lost. The excessive purulent secretion — (and this is the most remarkable fact), often vanishes as at a single stroke and the wound surface continues to secrete only a scanty amount of clear serous fluid. This frequently quite startling cessation of further purulent secretion is an indication that the suppuration is maintained not so much by the bacteria as purely chemically through the local excess of proteolytic pus ferment.

On this account I venture the proposition

that in ardent abscesses the surplus of proteolytic leucocytes is often more dangerous than the bacterial content. And I firmly believe that the diminished resisting power of an organism against infection depends often less upon a want of protective power than it does upon the failure of our inhibitory mechanism to prevent an excess in the various protective endeavors.

You will justly remind me that the results of the antiferment treatment are valuable in just those suppurations or in other words in the very abscesses which offer the most favorable condition for healing by the usual surgical measures. Nevertheless the antiferment treatment has just here a double advantage. The healing period is actually shortened. Gagan, in addition, extols during this period the easy changing of dressings. Furthermore, the antiferment therapy seems to be indicated in sharply demarcated suppuration in the interest of special functional and cosmetic results, and because it can for example in joint infections substitute for a large incision a small one, or even treatment through a puncture wound. The pus ferment dangerous as it is in excessive amounts is evacuated by incision; by antiferment treatment on the other hand it is neutralized and rendered inactive. Under certain conditions an antiferment treatment may accomplish more than an incision. The serum can pass into the wall of the abscess and there protect the infiltrated and injured tissue (Rantorowicz).

Even upon theoretical and experimental grounds the antiferment treatment must fail in purely infiltrating suppurations and in more diffuse suppurative inflammations which like beginning furuncle and carbuncle have not yet gone on to the formation of a circumscribed suppurative area. The antiferment can indeed be active only when in the presence of already accomplished pus fermentative tissue softening it can, through reciprocal contact, form a direct chemical union with the enzyme. In order, therefore, that the antiferment act to its full extent it must be brought into the greatest possible extensive and intimate contact with the suppurating surface. I will once more briefly mention that the antiferment therapy has given the greatest satisfaction in actively secreting fistulæ of the soft parts which have for a long time resisted other treatment.

The scope of such an antiferment therapy is by no means confined to the special branches of surgery, gynecology, and ophthalmology. Theoretically, endeavors made from the same standpoint come under consideration also in diseases of the meninges. Especially in epidemic cerebrospinal meningitis, in the meningo coccus serum, made for which the antiferment content is by no means the least active ingredient. Furthermore, in brain abscesses when in spite of operative opening and drainage the suppurative tissue softening often continues to advance. Moreover in suppurative pleuritis and peritonitis, in suppurative pulmonary diseases in which the inhalation of finely vaporized antiferment solution comes in question, and last but not least, in ulcerative processes of the gastro-intestinal tract. Why should one not as Hort in England has already done, attempt to administer by mouth as a nourishing, and at the same time physiologically protective remedy, an animal blood serum rich in antipepsin and antitrypsin, for the purpose of local antiferment treatment in ulcerative disease of the stomach? Blood serum is a very nourishing fluid and one which is rich in albumen and easy of absorption. The albumen of the blood serum in conjunction with its alkali is able to bind the surplus hydrochloric acid of the gastric juice, at the same time the contained antipepsin shields the ulcerated surface from pepsin and the antitrypsin protects it from the albumen dissolving leucocyte ferment. Besides we know from Weil that a normal blood serum is as in hemophilia an important aid in checking hæmorrhage.

I know full well that the last word concerning the value of the antiferment therapy of suppurative processes has not by any means been spoken. I must let myself be satisfied if to me is granted the knowledge that through a study of the biological processes of wound suppurations, viewpoints for a new and perhaps practically superior form of physiological therapy have developed, and it would especially delight me, if it were possible for us internists in this fruitful interchange of ideas with the surgeons, for once to give and not to receive.

REPORT OF FIVE HUNDRED CASES OF DIFFUSE AND GENERAL PERITONITIS FOLLOWING APPENDICITIS[1]

With a Plea for Early and More Complete Work

By J. W. KENNEDY, M. D., Philadelphia, Pennsylvania

(From the Clinic of Dr. Joseph Price)

PERITONITIS remains pre-eminently the most important subject which concerns the profession.

Although peritonitis has largely become the heritage of the surgeon, yet the operator's position and importance in this condition remains subservient to the general practitioner, and his mortality will largely be proportionate to the views and diagnostic ability of the family physician.

The more one sees of intraabdominal pathology the greater becomes our appreciation for the great worth of the skilled diagnostic ability of the general practitioner.

Any one with a considerable experience in the operative treatment in the various forms of peritonitis cannot help but have the greatest apprehension and feeling of insecurity when surrounded by a profession that has not been grounded in the importance of early recognition of all inflammatory conditions of the abdomen.

The young operator is so dependent upon the practitioner for his reputation that necessarily he has the strongest feelings for or against certain communities. He has learned from sad experience that he is being called to a neighborhood which waits until the undertaker's era has begun before asking for consultation.

Yet specialists should be charitable in their views toward the general profession for a late recognition of pathology, on account of the fact that surgeons are far from a unit in their views as to the time and manner of operative procedures.

Every deviation from first-hour operations in peritonitis establishes a precedent which permits the profession at large to view with alarming complacency, a rapidly progressive, and often fatal condition.

This permits me to ask this question: Has any one ever lost a patient from too early an operation?

My eight years' experience with Doctor Joseph Price commands me to answer this question in the negative.

This forces another question: Do we ever operate too late in peritonitis? The answer is a sad one.

The next logical thought is just this: Is there some safe period between the earliest and late operation? Right here is where the surgical profession is hopelessly divided, and ceases to be a stimulant to the medical profession.

Our surgical literature abounds in exhaustive compositions and discussions urging what they choose to call safe periods to operate. Any given number of operators may be united on first-hour surgical procedures when seeing the patient in the beginning of an attack of peritonitis; but this same number of operators on seeing the patient on the third, fourth, or fifth day of an attack of appendicitis (our most dangerous source of peritonitis), are uncomfortably divided in their opinions as to operation.

So we have fourth-day operators, fifth-day operators, and sixth-day operators. Can you blame the general practitioner for giving us late operations with high mortality?

It would seem practically useless to enter any discussion in regard to operative procedures until we have established some unity of opinion as to when to operate in peritonitis.

Dr. Price answered this question some years ago, and has consistently lived his surgical convictions with a mortality in peritonitis which challenges the world. He is perfectly unflinching in his views as to time to operate.

His dogma is, "Operate first hour at any stage."

This surgical aphorism has been the greatest comfort and protection to me of my professional life. It has given me any victories I

[1] Read in part before the Tri-County Medical Society of New Jersey.

have had, and any deviation from such teaching has been responsible for my lamentable failures.

This concise view, "Operate first-hour at any stage," is our only hope for a united profession in this terrible disease; the example will be so far reaching.

The early diagnosis will demand first-hour operations, which will then antedate the ice bag and opium treatment, and our reward will be a nil-mortality in most forms of peritonitis.

When you begin to make some differential discussion as to time to operate on the various sources of peritonitis, as to whether it is perforated appendix, suppurative gall-bladder or pyosalpinx on account of some sources of inflammation being more virulent than others, you only encourage later operations from each and all sources of peritonitis, and confuse the general profession.

If you possess a knowledge of distinction of virulence, among certain sources of infection, keep it to yourself, with the idea that it is not safe in the hands of even your friends. I repeat, there is no other possible solution of the question as to time to operate, than first hour at any stage.

Had the profession been united on this one question, it would have been impossible for me to report at this date, five hundred cases of diffuse and general peritonitis. Such report necessitates an apology to the laity and a rebuke to the profession. It must be convincingly evident that if we cannot be united upon the fact that no stage in peritonitis is too acute for operation, we must remain confusingly divided.

The strongest evidence we have that just such a condition of divided opinion exists, is this: During the last few years I have heard over a thousand practitioners and surgeons, representing every state and territory in the union, ask Dr. Price this question: On what day in appendicitis, salpingitis, or peritonitis do you operate?

If this question is answered by any other advice than that of immediate operation, you lay yourself open to an attack from several directions.

The profession must be given some definite time to unite upon in regard to surgical intervention in the acute inflammatory lesions of the abdomen. In order to bring about such a union, tangible signs and symptoms must be indicated to the general profession.

Any differential discussion as to time to operate in peritonitis, based upon any symptomatology, has been an utter failure.

Ask the general profession if they have an intelligent idea of any author's attempt to make a distinction of extent or nature of a peritonitis as applied to time to operate. Their answer is our greatest plea for first-hour operations at any stage.

For purpose of discussion: suppose you advise the inquirer to operate on the fifth or sixth day? This breeds confusion, as you will often be told that it was impossible to say just when the attack began.

Next, you must insure the patient and physician that all cases of inflammatory lesions proceed alike, and that on a certain day you expect the pathology to be at a definite stage.

Again, why have you a right to promise that there will be a fifth or sixth day, or a stage of quiescence? How are you safeguarding the patient?

Are signs and symptoms always proportionate to extent of interabdominal pathological conditions? Unless you have a better therapeutic ground for your operative inactivity in peritonitis than we are familiar with, you have no right to lapse into a stage of surgical lethargy in an active peritonitis.

If surgically you must grow apathetic, and hope and Christian Science must enter your professional career, please do not mix it with peritonitis. They are incompatible.

It is true without any possibility of denial, that the operator who waits for a stage of quiescence in peritonitis from any source, has no stronger foundation for such procrastination other than hope and trust (unsurgical terms), and reaps more peritonitis and death.

I do not want to be understood as saying that there is no such era of quiescence in some cases of peritonitis, as we have all seen subsidence of acute symptoms; but I do mean to take this stand: that you have no right to anticipate a stage of pathological rest in an acute virulent disease where progress can only be revealed by opening the abdomen.

Any surgeon who is not a first-hour operator during any stage of peritonitis becomes an obstructionist to early diagnosis. He has taught the general practitioner that there is some other hour than the first which is safe to operate; and has thus taken from us our strongest support, early diagnosis, and given in its stead a promise of operation if the patient gets well.

If one is called in consultation during an acute attack of peritonitis, and you refuse to operate during the acute symptoms, it would be interesting to know to just whom that patient belongs. The family physician has asked your assistance. You refuse to operate during the acute inflammation, but take a mortgage on the patient by promise to operate, if that hoped for stage of quiescence intervenes before death.

It would seem that the patient is without a physician from the time of consultation until death or stage of quiescence.

The surgeon is certainly responsible from the time he sees the patient during an attack of peritonitis, and if death occurs while he is waiting an opportunity to operate, such death must be figured as part of his mortality in his statistics. If such is not done, it simply means that the operator is picking his cases.

The fact that in some institutions patients with an active peritonitis are kept for certain operative hours or certain clinical days, is reprehensible. Dr. Price does not too strongly put it when he says, "The fire department teaches us our duty in peritonitis."

Helpful responsibility must be placed upon some one member of the profession. Divided responsibilities breed neglect. Dr. Price holds no one responsible for an error in the operating room. He is answerable for visitors, nurses, and assistant, and is the autocrat of the operating room.

The layman or physician who engages your professional services does not ask you who your assistant or nurses are, but takes it for granted that you are responsible for attendants.

That sublime degree of vigilance and protection can not be obtained by other than individual responsibility.

You must carry your own burden to be conscious of its weight.

Even the greatest degree of refinement of masterful technique will punish you by sleepless nights. Sacred responsibility and persistent efforts in certain directions encourage many inconsistencies in surgical procedures. This is but the natural history of great minds overdeveloped along certain lines.

It is said that Blackstone, the great lega commentator, believed in witchcraft, and cited the scriptures for his belief.

Voltaire says that when Newton discovered the law of gravitation, he excited the envy of the scientific world, but when he wrote a book on bible prophecies, men ot science got even with him.

The popular view in peritonitis of the surgical profession at this era is "anti-absorption."

As we feel there has been a marked degree of surgical inconsistencies along these lines, we usually have to modify the term "anti-absorption" and call it "anti-extra intestinal absorption," as the followers of this method of treating peritonitis are wholly unmindful of the absorption which takes place from a pathological mucous membrane of over twenty feet in length.

I am at a loss to know just why it is that the physiological surgeon has lost sight of the importance of drainage of the mucous membrane of the gastrointestinal tract in the virulent forms of peritonitis with obstruction or partial intestinal obstruction.

From the very incipiency of an inflammatory lesion, beginning with the cloudy swelling of the mucous membrane and extending through all stages of the inflammation to destruction of that particular viscus, until the serous surface is involved, the clinical symptoms must be largely those from absorption of toxins or bacteria from the mucous surface. So why should we so ignore this vast absorbing surface in the distended and obstructed bowel? Intra-intestinal drainage by puncture of bowel and releasing obstructions is indicated just as strongly as opening the abdominal cavity to drain the parietal or visceral peritoneum.

In laity terms, indigestion, bilious headache, sluggish liver, and all the mild autointoxications from the gastrointestinal tract are an appeal for drainage, and the clinician does it with a cathartic. We have often wondered

just why the internist has not called the attention of the world to a more extensive drainage of the obstructed bowel in a general peritonitis.

Peritonitis, other than the traumatic forms, is primarily a lesion of the mucous membrane, be it due to appendicitis, salpingitis, cholecystitis or typhoid perforation, and can and should be diagnosed as such in a large per cent of cases.

Therefore inflammations of serous membranes are largely neglected lesions of the mucous membrane and are again a plea for early diagnosis.

How often have we seen this exemplified in the removal of simple catarrhal appendix. The patient may have been an invalid for years, below weight, bad color, chronic indigestion, etc., and all symptoms due to toxins absorbed from small area of mucous membrane which has undergone a mild form of inflammation.

The removal of such an appendix will often amaze one by giving you a robust patient.

The physiological mucous-membrane is a staunch friend, but can not nor does not stand the offenses of obstruction and stagnant pathological fluids, which quickly convert it into an enormous area for absorption of toxins and bacteria.

The anti-extra intestinal absorption method (which we choose to call it) has as surgical factors of accomplishment a small incision for a lease of intraabdominal pressure, and insertion of tube to pelvis, or dependent points of the abdomen, the offending source may or may not be removed, depending upon as to whether or not it can be reached without disturbing adhesions which are not molested. The patient is put in the Fowler position and proctoclysis given.

It is a strange coincidence but a surgical fact, that operators working along entirely different lines approach the same goal by routes which seemingly are diametrically opposed.

Probably no operator has been as consistently radical in his toilets in peritonitis as Dr. Joseph Price.

In spite of the fact that the profession seem to be under the impression that he is not afraid of absorption of toxins and bacteria, on account of his fearless breaking of adhesions and releasing pus pockets and obstructions, he must be looked upon as the most consistent advocate of anti-absorption, both intra- and extraintestinal.

Early in his professional career he pointed out the dangers of obstructions or partial intestinal obstruction, following or incident to peritonitis, and his dealings have ever been directed toward the complications of this disease. It is not so much the peritonitis but fear of its complications.

If we would direct our surgery at the real existing condition, we would be oftener operating for intestinal obstruction and not simply talking about distended abdomen, which is not a symptom but a condition.

No symptom or sign ever killed a patient, but conditions do. If the members of the profession have at any time adopted Dr. Price's radical toilet in active or chronic peritonitis and failed, it must be due to an omission of detail and thoroughness in their technique.

The beginning of a radical toilet commands its completion. The obstructionist, as to completed procedures, such as the breaking of all adhesions, releasing pus pockets and obstructions, and flushing the abdomen, make this argument. It matters not how thoroughly you attempt to cleanse the abdomen in a general peritonitis, it still remains surgically unclean.

Quotation of results is the most forcible way we can answer this argument; and it would seem that they might allow us a little courtesy from the phagocytes when they expect so much from this source.

It is not at all clear to us just what the mental picture in peritonitis is to the operator who opposes the radical toilets.

We look upon the abdominal cavity in a general suppurative peritonitis, as a huge carbuncle with its honeycombed pus pockets, and although we can not make the crucial incision and curette here the intercellular spaces as we should in the carbuncle, we practically do the same thing in peritonitis by breaking adhesions and releasing pus pockets and obstructions.

We have not that mechanical view in general peritonitis which seems to be popular among

a large number of the surgical profession; therefore Dr. Price does not depend upon gravity to drain filth from distant points.

Evidently we have not the picture of free infiltration of inflammatory debris between and among coils of intestine, mesentery, and omentum which have become agglutinated enclosing pus pockets. Anatomically, some beautiful work has been done demonstrating the dependent points of the abdomen when in different positions, but it is a grave error to apply such mechanical ideas to the abdomen in a state of general peritonitis.

I have seen a number of operators inserting numerous drains to supposed dependent points of the abdomen, completely ignoring pus pockets above and between such drains.

We do not have pus pockets scattered through the abdomen as mere coincidences. There is a pathological and anatomical reason for such distribution of filth. The dependent points of the abdomen in peritonitis must not be looked upon as cesspools and the remainder of abdomen ignored on account of its altitude.

You are expecting too much of physical laws; gravitation of filth through inflammatory barriers is too much to ask of natural laws of gravitation. If gravity is such a ruling factor as to the distribution of filth, why do we not always have filth in the pelvis in suppurative appendicitis?

Operators with extensive experience know when the appendix is over the iliopectineal line, the pelvis will be full of filth; or when the appendix is behind the cæcum or between cæcum and parietes, respectively, you will find the inflammatory products.

Extension of filth by the accumulation of its products may be found in most any region of the abdomen, and metastatic conditions frequently take place from neglect and are always an appeal for earlier intervention.

Drainage, or any accessories to abdominal surgery, must not be based on probabilities, but on demonstrated conditions.

The material from which this paper is written is based on five hundred cases of diffuse and general peritonitis.

I have not included any cases where the peritonitis was not of sufficient extent to necessitate toilet and open treatment.

The term "diffuse peritonitis" is largely an arbitrary one. I would make this definition of it. If the appendix, cæcum, and over eighteen inches to three feet of ilium were involved, I would call such a diffuse peritonitis, and would include all degrees of extension, short of a general peritonitis, under the same term.

In one's statistics, reporting diffuse and general peritonitis, they must be demonstrated as such.

We are at a loss to know how operators can report cases of general peritonitis, when they are men who do not break up adhesions and expose viscera. It must be apparent that such reports take too much for granted.

An operator who does not make a general toilet in peritonitis, has no substantial surgical ground for reporting a general involvement of the peritoneum from any local tap. Such report, if given upon symptoms, such as general tenderness or distention, is without substantial foundation, as we have seen many patients with general tenderness and distention from a very minor involvement of the peritoneum.

The appendix over the iliopectineal line will give general tenderness and diffuse symptoms; again the distended abdomen may be due to an inflammatory lesion at the head of the cæcum involving a few inches of the ilium, or possibly an inflammatory band, elbowing the small bowel, which is very often seen within eighteen inches of the cæcum.

So before we can compare the relative merits of procedures in diffuse and general peritonitis, it must be definitely stated what has been the operator's method of demonstrating the extent of pathology.

Perforations of viscera are not always followed by general peritonitis and must not be reported as such.

Drainage is the salvation of the tardy diagnostician, and nearly always demands an apology.

In this series of cases we have not resorted to tube drainage in a single case. Gauze has been used entirely in the form of the properly placed cofferdam, without a stitch in the abdomen. In extensive inflammatory conditions with great quantities of filth, tube drainage is not sufficient.

Literature is full of discussions questioning the integrity and physics of gauze as a drain in peritonitis.

The philosophy of experience and common sense will answer all those who offend the greatest means of drainage we know anything about.

In regard to the physics of gauze drain, its fertility may be demonstrated in many ways. Suppose you insert a scientificially placed cofferdam in a filthy diffuse peritonitis; within three or four hours, the superficial gauze and cotton will be saturated. You change the same and in another few hours the same saturation takes place. This will continue with diminishing discharge for three or four days.

For the sake of argument for those who contend that the saturation of the superficial dressings is a physiological outpouring of serum incident to the insertion of the gauze as a foreign body, suppose you remove the gauze drain too soon, you will find a puddle of filth at the side of the cofferdam which would not have occurred if the dam had been allowed to remain the proper length of time.

If the gauze is not a drain, how do you account for the puddle of filth, which does not and should not occur if drain is properly placed and allowed to remain for a sufficient time?

The efficiency of the drain has been questioned through neglects of toilets. Operators have failed to find the ultimate pus pockets which may have later ruptured and deluged the drain, and thus the oversaturated drain seems not to be performing its function. What we want in drainage is continuity between the drain and the filth areas.

We should not expect to drain the Great Lakes by inserting a drain in Salt Lake. The fact that gauze drainage is not understood, is not properly placed, and has been expected to do the surgeon's handy work, has led to counter and multiple punctures of the abdomen.

The care of drainage has done much to modify the operator's technique. After Dr. Price's complete toilets, when the drainage is removed, there remains a dry well.

The operator who does not make a finished toilet, often finds a great quantity of filth at the site of the drain.

So he reasons that a counter puncture should be his next step in progress. His progress is in the wrong direction.

Multiple punctures of the abdomen in peritonitis simply means inaccuracy in diagnosis, a non-comprehensive idea of drainage.

One of the greatest pleas we know for drainage is the fact that those forms of peritonitis which are least accessible to drainage have a high mortality.

In the retro- or subperitoneal varieties of infection the mortality is high, not altogether due to the fact that the cellular tissue here is particularly adapted to rapid absorption of toxins; but that we are not able to drain this retroperitoneal space. These patients do not apparently die from peritonitis but a true septicæmia, if it is possible to make such a pathological distinction.

After operations on this type of infection your hopes will often be built on misleading symptoms, as these patients often die with a flat abdomen and soluble bowel; both symptoms which we would welcome after general peritonitis.

Unfortunately in this type of infection, we see the patient later than in the more superficial forms of peritonitis.

The appendix, when in the retrocæcal region, is not recognized as early as abscess between the cæcum and parietes; and is the most difficult form of appendicitis to drain and make a thorough toilet.

Pain in such a condition comes distressingly late, and is not a conspicuous symptom until the parietal peritoneum is involved. These retrocæcal conditions are responsible for a large per cent of the retroperitoneal infections and are similar in their symptomatology to the post-partum infections. In this type of infection we find the pulse rate and temperature in excess, when compared to the slight pain and tenderness incident to such condition.

When the appendix is in the pelvis or projecting over the iliopectineal line, I believe pain is an earlier symptom than the retrocæcal variety; but the location of a definite point of pain is misleading, and the rigidity of the right rectus muscle is not so well marked. The left side is often as rigid. The pain is a diffuse one. Tenderness in most any part of

the abdomen can be elicited; this variety also comes to the operating table late, due to the indefinite location of some point of trouble. The patient will give a very indefinite history of fleeting or unstable pains. The vaginal or rectal examination will reveal much in the pelvic variety of appendicitis; in fact no examination in peritonitis is complete without a rectal or bimanual examination.

When the appendix is between the cæcum and the abdominal wall we have early the typical symptoms of peritonitis; the early pains, tenderness, rigidity of the right iliac region, with slight elevation of temperature and probably vomiting, cannot very well be mistaken for any other condition.

Fortunately for the operators who do not break adhesions and make a toilet of the peritoneal cavity, this position of the appendix is most frequent and has the least mortality, for several reasons.

In the first place, on account of the typical symptoms, it is early recognized and surgical assistance obtained. It is the most superficial form, pus usually welling up as soon as the peritoneum is incised.

The abscess cavity in this location is more well defined and, therefore, easily drained. However, even in this type of appendicitis you have not done your duty until you have explored the pelvis and region between the ascending colon and parietes, as the filth may have extended from accumulation of quantity in both directions. It is probably with this variety of appendicitis that the early operators had their victories as it is possible to conceive that an incision such as the mere lancing of a boil, would save a certain per cent.

We cannot help but feel, in these days of advanced surgery, that it might be unfortunate for an operator to have had considerable experience with these cases and not be familiar with the diagnosis, pathology, and surgery of the rectocæcal and pelvic varieties of the disease.

Surgery applied to this superficial condition is wholly inadequate to reach the other deeper varieties.

If operators will review their experience, they will probably find that their mortality did not come from the condition where great quantities of pus flowed from the incision, but from that condition in which the appendix was reached with great difficulty or probably not reached at all.

With a degree of propriety the profession at the present hour can be divided into two classes. First, the physiological surgeon, who directs his surgery towards assistance of the natural physiological resources; and secondly, the pathological surgeon, who boldly attacks peritonitis through and by what we call a completed toilet of the peritonitis and its complications; viz., obstructions, etc.

We are fully conscious of the great debt of gratitude which we owe Metchinkoff and Wright for their exhaustive work with the phagocytes and opsonins, but it does not seem they have asked us to make our surgery less radical because they have given us some rational knowledge of the physiology of our natural powers of resistance to invasion of infection.

I am unable to see where they have dictated to us as to where, when, or how we shall do our work. They have illuminated our physiology but have not intruded upon our pathological surgery. Dividing the surgical profession into two classes, physiological and pathological, Dr. Price with his completed toilet must be looked upon as the greatest advocate of pathological surgery.

The literature of the present hour is so forcible in its condemnation of the Price toilet, and even so bitter in its denunciation, to the extent that some authors go so far as to say that it is criminal to break adhesions in the presence of pus.

Why can one operator win with a technique where the other fails? What are some of his working factors? To say nothing about a personal endowment, courage, skill, and judgment, we find this operator working with the most simple technique possible.

The patient is always in the horizontal position. The Trendelenburg position is never used. Therefore the lungs are not overflooded with venous blood.

Post-operative pneumonias are never heard of. Whether this complication does not occur because the patient is in the best position to take the anæsthetic (which is always ether)

or whether it is due to the completed toilet, which prevent the subdiaphragmatic, metastatic or hepatic abscesses, we are unable to say. I feel both are important factors.

Rubber gloves are not used. The hand is always at its best manipulative power. The sensitive and intelligent hand has its greatest demand in dealing with the adhesions of a peritonitis.

Heaving and pulling at a bowel in order to break a fixed point is one of the most rude steps in an attempted toilet. Slight traction on the intestine, in order to define the fixed point, is all that is necessary. The adhesions must be released by expression or pressure with thumb and finger at the expense of the adhesion, and not by traumatic traction on the bowel. Such manipulation cannot be intelligently done with the gloved hand.

I shall not discuss the hæmorrhage mortality from the glove, but it has one, from insecure ties. Each little refinement of technique which you may attempt with the gloved hand falls a degree short of that surgical consummation of detail which wins the fight.

Slight abrasions and all lacerations of viscera should be carefully and quickly repaired with fine silk and small straight cambric needle.

This work cannot be done as quickly and thoroughly with the gloved hand. If the glove has given us anything in cleanliness, it has had its drawback through loss of time and imperfection of work in all the finer points.

I could not afford to say this, if I had not seen hundreds of patients operated upon by gloveless hands and not even a stitch blush follow.

I feel in peritonitis where the glove is quickly soiled, and not as easily cleansed as the bare hand, it has been a positive harm. Peritonitis and its complications are the most important lesions which confront the surgical profession, and we cannot afford to be handicapped by any means which obtund our special senses or interfere with our working factors.

I have seen a number of operators attempting to do what they called the Price toilet in a peritonitis. I could not have recognized it as such even if it had been so labeled.

To attempt to describe his technique would be a miserable failure.

In 1879 he began his fearless work upon a patient who was dying from a general peritonitis following a criminal abortion, which is one of the earliest procedures of a completed toilet. This patient was eviscerated, flushed and drained by his cofferdam, which antedates the Mikulicz drain, and the patient made a good recovery. His toilets ever since have been consistently radical, and only with the view that the ultimate point of infection must be reached, can you win.

It would seem from the literature of the day, that the presence of pus when operating for appendicitis is a command to stop all manipulative procedure. It is decidedly a command to go on and reach the source of trouble. The presence of pus should be looked upon as merely the trail of the offender, and not as a pathological entity. You may have pus in the pelvis or in region of the appendix from a perforated gall-bladder. So we reason that its presence invites investigation which should not end short of the infecting source. I should be unhappy indeed in my work if the presence of pus was as forbidding to my progress in toilets as it seems to be to many.

The unfortunate part of timid surgery is that it will breed more timid surgery. The profession is being taught that the acute spreading lesions with high temperature, are not operative cases, and that a stage of quiescence must be waited for.

Our only hope is that the practitioners who have had the experience of seeing their patients operated upon at the first hour in any stage of a peritonitis, and by an operator who seeks the distal source of infection, will demand advanced and early surgery.

I feel that the divided views of the profession in regard to early work is both reprehensible and sad. To feel that we have at our fingers' tips a means which can blot out any probable mortality from appendicitis, yet thousands of the youth of our country die yearly.

I hold it true, that any death from appendicitis in an educational center, is a human error, be it the unwillingness of the patient, the tardy practitioner, or erring surgeon. It would be fortunate if the profession felt that every case of appendicitis was fatal without operation. We would then be operating for

the lesion *per se* with nil-mortality, and not peritonitis.

Possibly if we ceased to use the word peritonitis and used in its stead the term neglected lesions of the peritoneum, it might serve to stimulate the tardy diagnostician and operator. I have been so often asked to describe the completed toilet of Dr. Price in the presence of diffuse or general peritonitis, following appendicitis, some of the general points may be related.

If you have reason to feel the condition is not a general one, and the abdomen is not much distended, the incision may be on the right side. The semilunar is a good working point and not necessary to sever any muscular tissue, although the incision through the right rectus muscle is an excellent one; yet here you will have more resistance from the abdominal walls and, therefore, not so good for drainage. In clean cases, the right rectus muscle is an excellent point of entrance.

If pus or lymph appears in the incision, take it for granted the abdominal cavity is filthy throughout, and only permit investigation to determine the extent of the peritonitis. That is, you take nothing for granted and find the ultimate infecting source. Remember that the gangrenous or perforated appendix is a perforated bowel, and should be just as diligently sought for as such lesion.

When pus or lymph appears, let your mental picture of the condition be that of a perforated viscus. Take this strong position and you will not be expecting providential results from a perforated appendix, pouring its venom into the peritoneal cavity.

There is little use to attempt to clean the sewer until you have stopped its source of filth. To simply open the abdominal cavity and drain without thought of toilet and repair of the perforated lesion, is a procedure without surgical grace. In making a toilet in the presence of peritonitis by visceration and cleansing of viscera, do not dive or delve through pus laden area to seek the appendix, but deal with the viscera which is first accessible and make your toilet by dealing through continuity of structure of viscera, until you have defined the offending point.

In the presence of filth, work from the inside out and not from the outside in. If you have opened into a pus cavity do not make any attempt to wall off the supposed uninvolved viscera, by attempting to pass gauze over or through a filthy area with the idea of protecting the general peritoneal cavity. The fallacy of this is self-evident. However, if the incision has been made toward the median side of an abscess from the perforated appendix, and you have exposed uninvolved viscera, it is well to protect the general peritoneal cavity by inserting a gauze towel, before you attempt to break adhesions in order to get the appendix.

Get rid of the toxic matter as you come to it. Do not work in the midst of filth. The evisceration may be done beneath a stream of hot saline solution, sponging off the viscera with gauze, which is an excellent method to remove the big pieces of inflammatory lymph which cling to the intestine.

Dr. Price often says "expose both sides of the mesentery," which simply means that all adhesions must be broken before such is possible. In regard to the use of hot saline solutions in the toilet of a peritonitis, we have hesitated to make any statement as to just how high a temperature saline should be used. I am sure our solutions should be much warmer than they are. We have noticed in those patients where the irrigation had been of such a temperature that it was painful to the operator's hand, these patients left the table in better shape and were benefited by early bowel movements. The heat applied in such manner would be an excellent general stimulant, as well as one to peristalsis, both indicated in these abused patients. We are unable to say what additional antiseptic properties, if any, the hot solution has over the ordinary warm saline. Evisceration is never done by traction, but by inserting the finger between the adherent viscera, find a line of cleavage, and follow the point of least resistance.

In some cases you can enucleate clumps of adherent bowel and omentum and deliver the mass, as you would a tumor or a tube ovarian abscess, and then separate the viscera after you have delivered the mass. In other words, you deliver the viscera by lifting rather than by traction or pulling. I have seen an operator pull the intestine in two, or tear it from its

mesenteric attachment, and then wonder why his patient did not get well by the Price toilet.

The operator's ability to deal with adhesions will largely settle the question as to whether he will be a physiological or pathological surgeon. Disorganized or gangrenous omentum is removed, and all abrasions or lacerations of the bowel are repaired as you come to them. The presence of pus in a diffused peritonitis is not an indication that the entire abdominal cavity should be irrigated. The toilet is always proportionate to the extent of the peritonitis. The irrigator has its greatest virtue in those patients who have a general peritonitis with distention; even in those cases it is of little service as ordinarily used. You can not cleanse the abdominal cavity by simply passing the irrigator to a dependent point and then flooding the viscera with gallons of solution. It might be a conscience toilet but it certainly is not a surgical one. The irrigating solution would not come in contact with one twentieth of the area of the involved peritoneum. In cases of general peritonitis with distention, the incision should be in the median line, and the toilet a general one, and can only be done by evisceration.

Cleanse the bowel as delivered, exposing both sides of the mesentery and while the bowel is external, then irrigate the pelvis and both loins. Prevent the viscera from prolapsing into the pelvis as you irrigate. Two big fingers and the irrigator are a trivalve speculum which controls the viscera and permits the solution to come from the abdominal cavity with a gush, carrying debris with it.

Operators claim that this excess of manipulation greatly increases the distention of an already distended bowel and that if they eviscerate they are not able to return the bowel. Certainly we should not attempt to return a distended bowel into the abdominal cavity, nor should we permit a patient to leave the operating room with a distended bowel. In a general peritonitis with distention we always puncture or incise the large and small bowel in as many places as is necessary to get rid of the gas and liquid fæces. This is truly the greatest drain, both intra- and extraintestinal. We get rid of the septic contents of an obstructed or partially obstructed bowel and lessen peritoneal absorption by release of intraabdominal tension, to say nothing about the drainage of the obstructed bowel, which is all important. I feel that the release of tension from the collapsed bowel incident to the puncture, is a far more material factor in the release of intra-abdominal tension, than the small incision and drainage tube of the physiological surgeon. Even in strangulated hernia where there is much distention it is a very good rule to make an incision in the median line, so as to be able to deliver and puncture the distended bowel.

It is remarkable how quickly the bowel regains its physiological peristalsis when the tension from the distention has been relieved and you have irrigated with hot saline solution. I have seen such bowel regain its tone while the intestine was still eviscerated; and in a few hours after the operation, the patient would have copious bowel movements of liquid fæces. I am unable to see how the anti-absorption or physiological surgeons are going to reconcile the great and virulent absorption which takes place from the mucous membrane of an obstructed and distended bowel for which they forbid manipulation, on account of increasing peritoneal absorption.

It certainly is still a disputed question as to whether peritoneal absorption is increased or decreased in presence of a general peritonitis, and it is more than possible that the absorption from the mucous membrane of the obstructed or partially obstructed bowel is the final blow. A patient will die from a strangulated bowel with little or almost no evidence of peritontitis. The distended abdomen is a nightmare to the surgeon. It is true a patient with a retroperitoneal infection will die with flat abdomen and soluble bowel, but this cannot be truly called a peritonitis.

In the light of our present knowledge of peritonitis, we cannot afford to overlook the absorption which takes place from the mucous membrane of the obstructed or partially obstructed bowel. Whether the absorption of toxins is peritoneal or mucous, we are between two fires and it is hard to tell which is the hotter. I do know this, that Dr. Price has always laid great stress on relieving all obstructions and draining the distended bowel by puncture, and his results remain unexcelled. Therefore, in

general peritonitis our surgery is directed toward the complications of the general peritoneal involvement.

I am sure the profession has not understood Dr. Murphy in his magnificent work on peritonitis. The profession seems to be under the impression that Dr. Murphy does not seek the gangrenous appendix or perforated bowel, but depends upon the Fowler position, drainage, and proctoclysis to take care of the perforated lesion. I take the privilege of stating that this operator has no such mental picture, and consistently closes all perforative lesions of the viscera.

It is true that diminished peristaltic action of the intestine decreases peritoneal absorption. If we did not have to consider the intra-intestinal absorption, possibly our surgery might end with a hypodermic of morphia and withholding food, which is the most primitive step of all. If the fluid in the abdominal cavity incident to a peritonitis is early bactericidal, I am at a loss to know why the physiological surgeon puts his patient in the Fowler position to drain away this fluid. If you attempt to make any distinction of time as to when this bactericidal fluid becomes pathological you are trying to take a position which is not tenable from symptoms or signs. Experience has taught us that the early removal of such fluid by toilet of the abdominal cavity, even in the early stages of the condition, with temperature of 103 or 104 degrees, we are rewarded next morning by a temperature of 99 degrees and free drainage. If peritonitis we must have, give us the patient with a temperature of 103 or 104 degrees. We welcome it.

If there is a general involvment of the peritoneal membrane by some infecting means, how much physiological assistance must we expect from the natural powers of resistance from an early conquered endothelial membrane? What remaining power has the peritoneum in a general peritonitis? We cannot afford to permit the experiment with chemical irritants to too much modify our surgery in peritonitis.

The chemical irritant is an integral dose and has not the power of progressive production of toxins, and is applied to the normal peritoneum. Nor should we permit the injection of cultures of bacteria to greatly influence us. They also are applied to the healthy endothelial membrane or possibly to one which has been previously affected by an irritant. The fact remains that about all of the surgical lesions with which we deal are primarily mucous lesions; and before they are peritoneal in involvement have destroyed the viscus in continuity of structure, so that the powers of resistance of the peritoneum must largely be influenced as to whether the irritant is of the peritoneal or mucous membrane in its incipiency. For instance, appendicitis by extension of inflammation from the right tube and ovary through continuity or contiguity of structure, is not so virulent or dangerous as the condition we see in the appendix, where the primary infecting means has had its origin in the mucous membrane of the appendix itself.

Experiments have been made by injecting a known culture of bacteria into the healthy peritoneal cavity and a fatal peritonitis did not follow; yet, if the same dose is injected into the cavity where an obstructed bowel is present, fatality may follow. We feel this is a strong plea for complete relief of all obstructions, which can only be done by the toilet operator. Please compare the two following conditions of a general peritonitis.

Suppose in the first patient the viscera are bathed with pus and inflammatory lymph, yet there is no marked distention from adhesions or obstructions. From this patient remove the appendix and let your toilet be a peritoneal one in its extension, drain with a cofferdam, and the patient gets well. The next patient also has a general peritonitis, but has adhesions, obstructions, and distention of the abdomen.

If you make the same toilet in this condition as in the first instance and do not relieve obstructions and incise distended bowel, you will probably lose the patient. In the first instance, the toilet was peritoneal and was all that was indicated. In the second instance the toilet and drainage were both of the peritoneal and mucous membranes, as both were indicated. It would seem that it matters little whether the obstructed bowel is due to a mechanical ileus or to a paralytic condition which is due to a direct toxic effect upon the nerve filaments, or cellular infiltration of the

subperitoneal spaces; the indication for drainage of bowel remains the same.

I repeat that the gauze drain has been used exclusively in all our patients in the presence of diffuse or general peritonitis. This cofferdam drain is a solid cylinder drain, and is not composed of a number of flying buttresses or strands of gauze inserted indiscriminately between the viscera. To know anatomically that there exists a dependent point, and then to insert a drain on the hypothesis that it should be full of pus, is no part of our surgery. The insertion of a cofferdam of gauze is a perfect piece of civil engineering. If the pelvis is to be drained, all viscera are held above the iliopectineal line and the gauze, as a solid wall, fills the pelvis.

The right groin is drained in the same way. The viscera are retracted toward the median line and held back of the left hand, while the cofferdam is inserted; thus, in the very bad conditions, the dam or drain extends from the left side of the pelvis around to the ascending colon. If the bowel is black and disorganized, it is well to produce an artificial fistula and stitch the bowel to the drain or parietes.

One of the reasons gauze has been abandoned as a drain is that operators have indiscriminately inserted it between the viscera; postoperative obstruction following. As soon as the gauze was removed, the obstruction was relieved; the reasoning which would follow is apparent.

Successful surgery is made of such an infinite number of niceties that necessarily we all must cripple the other man's hobby. All operations in which adhesions are not broken, obstructions relieved, and the ultimate source of infection sought and found, are followed by from twenty-five to thirty per cent of reoperations for postoperative intestinal obstruction or are reopened for distal pus pockets. Pneumonia, septicæmia, septic emboli, metastatic infections and secondary abscesses, must be anticipated and do follow imperfect toilets.

The surgery which we are asked to see and do, following these incomplete procedures, is appalling.

I have seen in consultation this week three patients on whom sections had been done for appendicitis, all over six months from the primary operation, and each with a fistula which would permit my big finger, and each still the unhappy possessor of his or her appendix. A fistula with an obstructed or partially obstructed bowel distal to it will not close, and there is no use to expect miracles in these days of plain hard work. I have not time to go into a discussion of the distressing morbidity which follows the operator who has not done good primary work. It will wreck many homes financially and morally. We have not had in the series of cases which comprise this paper, a post-operative obstruction nor a pneumonia. Permanent fistula following appendicitis when obstructions are released and appendix removed does not occur.

I did not intend to make any discussion in regard to the technique of removing the appendix, but three operations within the last five weeks following imperfect removal of the appendix, force me to add a word.

In the first patient, a child, the right tube and ovary were strongly adherent to the site of the removed appendix. There was no salpingitis, as it occurred in a virgin.

In the second patient, the head of the cæcum at the point of removed appendix was strongly adherent to the parietal peritoneum.

In the third case, the ileum ten or twelve inches from the ileocæcal junction was adherent to the site of the removed appendix, causing a partial obstruction. In each case the stump of the appendix could be demonstrated, and all had been primarily clean cases. To bury the stump of the appendix in a dead space undrained is unsurgical in every step, and, unnecessary procedure. All procedures which do not entirely remove the appendix are subject to criticism.

The remaining stump in a good number of cases must become an ulcer and therefore a point of irritation followed by adhesions. The operator who persistently leaves a part of the appendix will have no greater reward for his incomplete procedure than those operators who are attempting conservative work on infectious lesions of the uterine appendages. The literature of the present hour, discussing the treatment of the stump after removing the appendix, must be looked upon as antiquated surgery.

There have been some recent contributions on adhesions following the removal of the appendix. I would give the remaining stump as solution for such conditions. I described the technique of Dr. Price's complete extirpation of the appendix in the September number, 1905, of the journal of SURGERY, GYNECOLOGY AND OBSTETRICS. It is extremely unfortunate that the complete removal of the appendix has been condemned on account of a supposed predisposition to hæmorrhage.

I have a personal knowledge of over five thousand cases in which Dr. Price or I have performed the stumpless operation without an instance of hæmorrhage.

To admit that the operation is not safe is to admit that the operator cannot safely close a perforation or gunshot wound of the bowel, as this is all there is to the stumpless operation.

It is seemingly a paradoxical statement to make, but a review of the deaths we have had seems to indicate that our surgery was right and that in practically every instance the peritonitis had been resisted, death taking place from a true septicæmia or retroperitoneal infection. I make this statement as some proof that we can and do get rid of the toxic products of infection by complete toilets, and not as any apology for our mortality.

Our patients did not die with distended abdomens nor bowel obstructions following the operations, both indications of continued peritonitis. I am perfectly familiar with the fact that even in those cases where the patient succumbs from a continual peritonitis, in the last few hours there may not be as much distention as had been. We have frequently been informed that the patient is better as there is less distention and no pain. You will probably find this patient with a subnormal temperature, being in collapse and the end soon follows. In the five hundred cases of diffuse or general peritonitis, we had nine deaths. This includes the deaths in the hands of several assistants.

In one hundred and twenty-four of these cases the incision was in the median line for a general peritonitis with distention.

In the remaining cases with a diffuse peritonitis, the toilet was always proportionate to the extent of involvement of the peritoneum. In these diffuse cases we could have very easily reported most of them as a general peritonitis had we not been toilet operators, and thus defined the extent of the peritonitis. Three of our deaths were in patients seventy or older. One of the cases died one hour after the operation. This patient went on the table with a subnormal temperature of 96 degrees. I told the family the patient was in collapse, and only operated upon earnest solicitation of the father.

Another patient I lost was a vigorous man with cæcum and appendix on the left side. The appendix was gangrenous and retrocæcal. My error in this case was that I made the incision on the right side. It should have been in the center. My toilet of the left side would have been better and should have saved this patient, as it was, he died with symptoms of retroperitoneal infection.

All patients had the open treatment, not a stitch in the abdomen, and the cofferdam drain. The Fowler position was not used in any case. In fact the reverse position, or the foot of the bed was elevated in the worst conditions. This position was not used with the idea to increase or decrease absorption but to place the patient in the best position to resist shock of operations. You must give the nerve centers blood in these abused and neglected patients. We depended upon the complete toilet and not position for anti-absorption.

Proctoclysis was not consistently used but there can be no objection to its use. From the surgical neglect through incomplete methods which we have seen in the last year, we cannot help but become defensive, for even our own protection.

The multiple fistula, the intestinal obstructions, or partial intestinal obstructions, distal abscesses which are incident to a failure to reach the ultimate source of infection, partial or entire failure to remove the appendix, must become even more numerous through need of more toilet operators.

The future will give us impossible surgery. We repeat, that practically every death from appendicitis is a human error and that our surgery at the present hour is twenty years behind the progress of aseptic and complete work.

A POSITIVE PRESSURE CABINET FOR THORACIC SURGERY

By SAMUEL ROBINSON, M. D., Boston, Massachusetts
Surgeon to Out-patients, Massachusetts General Hospital; Visiting Surgeon to the Harvard Clinic

THE use of differential pressure in operations within the thorax has been the subject of much discussion. It should be a source of satisfaction, furthermore, that the disputes as to the comparative adaptability of the positive and negative pressure methods are becoming less frequent, for experimentation and practical experience have proven that both methods perform the desired function of preventing the possible ill effects of operative pneumothorax. The fact that there is a predominance of positive pressure apparatuses in the clinics of this country and Europe does not imply a superiority in method, but rather a prevailing preference for the simpler and less expensive apparatus. Not less than thirty-five clinics throughout Germany are supplied with some form of apparatus for differential pressure. From this fact alone, one might infer at least that surgery has come to recognize the usefulness, if not the necessity, of these contributions to the operative approach to the thorax.

It is not sufficiently recognized that F. Sauerbruch of Marburg is responsible for both forms of differential pressure. In one of his first publications he called attention to the possibility of reversing the patient in his negative pressure cabinet, at the same time converting the pressure within the cabinet to the positive form. The anæsthetist was thus enclosed with the patient's head within a chamber of compressed air. To Brauer and Peterson should be credited the development of the use of positive pressure as first suggested by Sauerbruch, and for the construction of apparatus. Brauer has furthermore contributed much to establish positive pressure as a reliable form of differential pressure for use in thoracic procedures, and many others have since published operations and experiments to further this conclusion. Engelken, in 1904, definitely recognizing Sauerbruch as the originator of the pressure theory, described a positive pressure cabinet with a special suction device for the removal of escaping ether or chloroform fumes. Willy Meyer has recently published an account of a double cabinet, which consists of a positive pressure cabinet resembling Engelken's, within a larger negative pressure cabinet, similar to the Sauerbruch chamber. With this combination of methods Dr. Meyer has the opportunity to employ either or a combination of the two. From animal experimentation and operation on the human with differential pressure, one might conclude that either method answers the requirements in thoracic surgery, with the one exception of total excision of the lung in the normal dog in which Sauerbruch and I have stated in a recent article the negative pressure can with greater safety and certainty insure the later obliteration of the emptied pleural cavity. But until it has been proven by an extensive series of operations on the human that the combination of methods can produce better results than either method alone, or that negative pressure is attended with greater success in the treatment of pathological conditions of the thorax than positive pressure, I am content to continue with the simpler use of positive pressure alone. There may be, however, certain abnormal conditions of the thoracic organs as a result of which the circulatory or respiratory conditions would be favored more by one pressure than the other, and much credit is due Dr. Meyer that he has made such future determinations possible.

I present this positive pressure cabinet described below, because certain of its features may be regarded as improvements. In so doing I do not offer it as a substitute for the smaller portable apparatus which I described in this journal a year ago, and which, in its modeled form, is pictured in this article (Figs. 7 and 8). For emergency and "out-of-town" operating such an apparatus is best suited, especially when manipulated by one accustomed to its usage. While in Germany I witnessed a transthoracic resection of the œsophagus by Prof. Sauerbruch. The patient was fifty miles in

the country. Dr. Tiegel of Dortmund transported his portable positive pressure apparatus thither, and maintained the inflation of the lung during the operation with perfect success. A mask was used and was briefly omitted on two occasions for the passage of an œsophageal bougie, without the onset of unfavorable symptoms, although two-thirds of the lung and much of the heart were exposed by a large retracted intercostal incision.

Of the efficacy of such portable apparatus I am convinced, but, given the opportunity to construct an apparatus best suited to the needs of the Massachusetts General Hospital with a large operating and anæsthetizing staff, I endeavored to construct a machine which should become one of the regular appointments of the operating room, not subject to injury, readily accessible, and easily operated by the least trained anæsthetizer. Economy of cost and space were to be considered, but portability was not essential. In choosing the cabinet form of apparatus I was further influenced by the desire to provide for the administration of any form of anæsthesia which might prove indicated in a given thoracic case. In a series of twenty-three such operations by me in the past year I have been much impressed by the anæsthesia administered by Dr. Freeman Allen, who has used ether, chloroform, anæsthol, and other mixtures with and without oxygen, interchangeably as the condition of the patient seemed to indicate. The patients have left the operating table without evidences of excess or ill applied anæsthesia, and of the four fatalities in this group, none could be credited to the narcosis. The cabinet method seemed to be the best opportunity for selective anæsthesia, and the problem of providing the portable apparatus with this possibility bid fair to render it too complicated to be manageable by those not especially trained in its use. Although, as I have stated in previous papers, the temporary removal of a mask, such as is used in the portable apparatus, is not attended with any considerable danger in most thoracic operations, it must be admitted that with a cabinet, the possibility of such accident can cause no anxiety, for the pressure may be retained at a lower level while the anæsthetist has complete control of the air passages.

This new apparatus consists of two parts (Fig. 2): a cabinet constructed of sheet metal, 5½ feet high, 3½ feet deep, and 4 feet wide; and a wooden box 2½ feet high, 2 feet deep, 2 feet wide, and 3 feet long. The cabinet is for the anæsthetist and the patient's head,— the box contains two ventilating pumps with one-sixth horse motor attached to each.

The front of the cabinet (see Fig. 1) presents a four-sided hood with a window in the sloping upper wall through which a light shines downward upon the patient's face. The purpose of this hood is to allow elbow room to the operator and assistant. It is riveted to a metal slide which can be raised and lowered by means of the wooden wheel adjusted at the bottom of the cabinet to a rack and pinion gear. As may be seen in Fig. 5, it is desirable to raise the hood if the patient is to be operated in the semisitting posture. The lateral adjustment of the hood to suit the posture of the neck and head may be accomplished by moving the cabinet to the right or left as the occasion may indicate. It may be said that this adaptation of the cabinet to the position of the patient has not been entirely satisfactory in other cabinets. The hole in the hood for the insertion of the patient's head is lined with a rubber collar which is elastic enough to permit the entrance of the head and yet firm enough to resist the pressure in the cabinet without ballooning. This collar is cemented to a metal frame which is riveted to the hood. The persisting seams are closed with asbestos cement. Attached to the same frame in similar fashion is an inside collar of thin rubber cloth with purse string (Fig. 4). This collar, when under positive pressure, is supported from tearing by the outside pure rubber cuff. The purse string need only be drawn loosely about the neck, for considerable leakage is permitted at this point without materially changing the pressure on account of the excessive volume of the two pumps.

Through a glass window, also, on the front of the cabinet one may read the water manometer which is supported before the window on the inside. The anæsthetist can therefore read the same manometer. On the right side of the hood are two small megaphones, one connected with the air tight ear caps worn by the

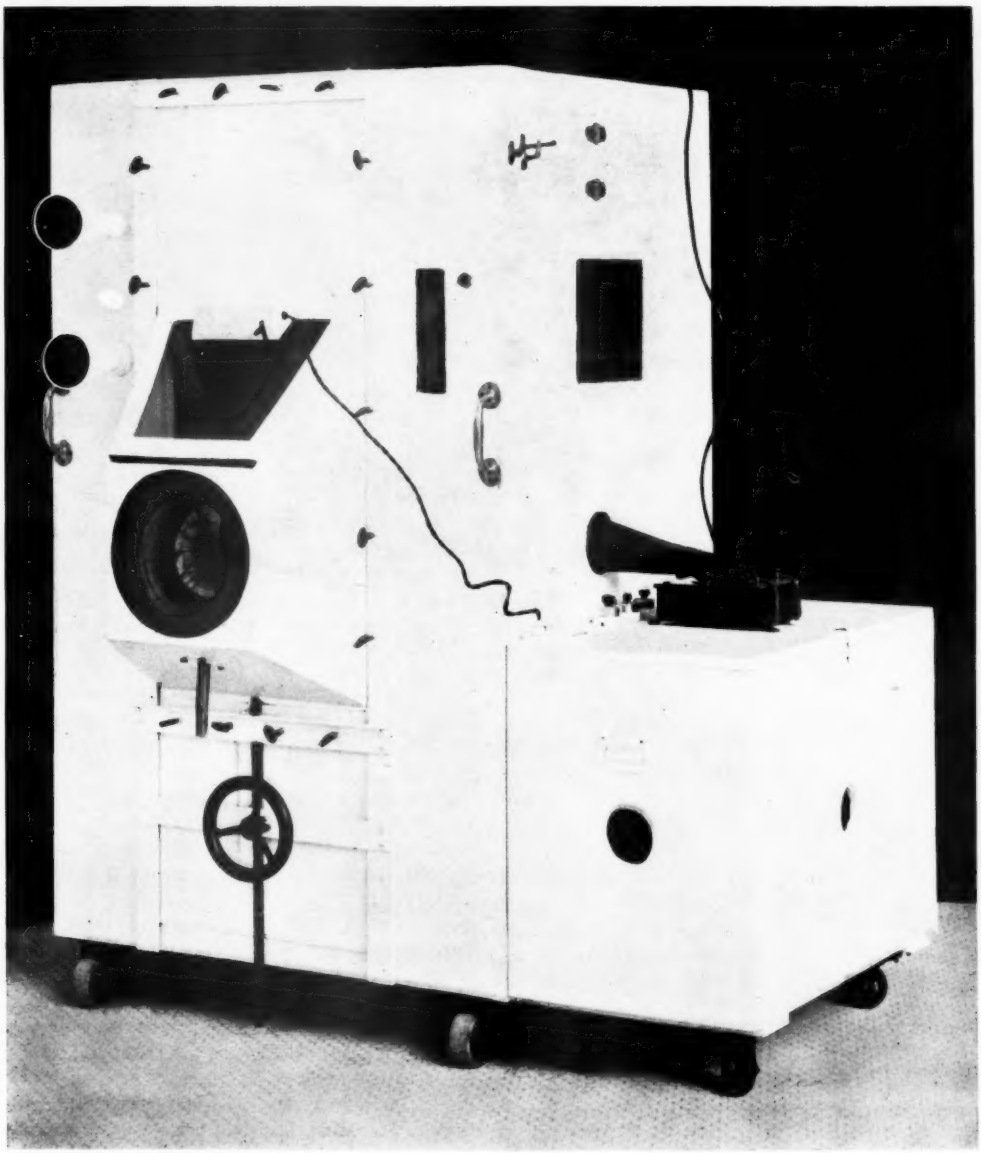

Fig. 1. Positive pressure cabinet and pump box. Front view, showing metallic hood with window and electric light, double rubber collar, and mechanism for raising and lowering hood, megaphones, manometer window.

anæsthetist (Fig. 3), the other with the speaking tube mask seen in the view of the interior of the chamber. The megaphones are at the level of the operator's face, and without turning towards the megaphone, his voice can be heard by the etherizer. The wall of the cabinet to the left of the anæsthetist, as seen in Fig. 2, includes a window. In front and in the upper corner is seen the outer door of a small air lock. The corresponding inner door of this chamber may be seen in Fig. 4. The included chamber is large enough to hold an ether bottle, œsophageal sounds, or any other paraphernalia which might be passed to the anæsthetist. As the inner door is not opened until the outer one is shut, the pressure reading of the manometer is not altered. In about the center of this left wall, at the level of the top of the pump box, there is a hole, around which is riveted and cemented a heavy large rubber glove. By inserting his hand in this glove, the etherizer may regulate the switches and rheostat on the top of the pump box. The object of this arrangement is to remove from within the cabinet all possible electric sparks which might ignite ether fumes. Furthermore, the control of the pumps is also possible to the operator or his assistant, although when once in action, these pumps may be allowed to run without alteration, and any change in pressure can better be made by the operator by means of the lever on the opposite wall of the cabinet which regulates the air escape. It is of some importance, however, that given an etherizer entirely unfamiliar with the mechanism, the operator can control or order the control from without. Fig. 2 pictures on this same left wall near the bottom two holes $1\frac{1}{2}$ inches in diameter. The efferent pipes of the two pressure ventilators which protrude from a corresponding position in the adjacent side of the pump box, enter these holes in the cabinet when the box is approximated to it. Two rubber washers and brass nuts applied from the inside of the cabinet make the union firm so that the cabinet and pump chamber move as one on the ball bearing casters attached to each.

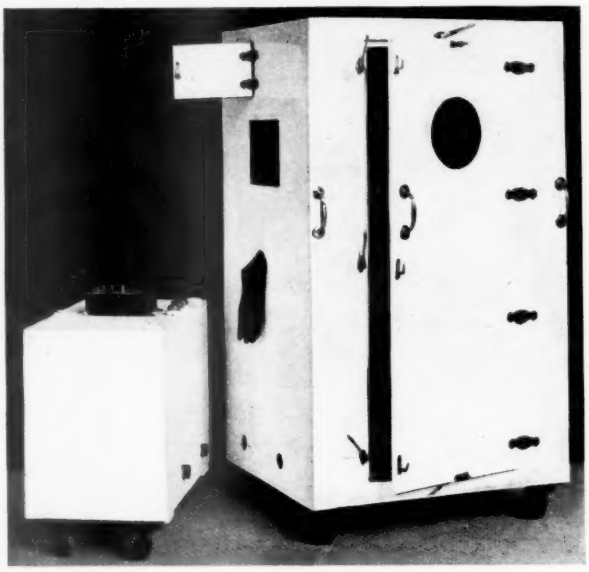

Fig. 2. Left and back walls of cabinet. Pump box disconnected. Outer door of air lock open. Outer arms of refrigerator locks.

The opposite or right lateral wall presents a glass window at the level of the anæsthetizer's face. In the forward upper corner (Fig. 5) is shown a lever by which a valve 2 inches in diameter may be regulated. This is the main escape for air from the cabinet and the slightest variation in the size of the opening will, of course, cause an immediate change in the manometer reading. More than the necessary pressure may be obtained without at any time entirely closing this valve. There is, therefore, a tremendous air exchange constantly going on within the cabinet even while the pressure is maintained at the desired level. The exhaled carbon dioxide of the patient and the anæsthetist is constantly disposed of together with ether fumes. There has not been the slightest sensation of ether or chloroform effect to any anæsthetist who has operated within the cabinet. As stated above, the operator may vary the pressure in the cabinet

Fig. 3. Anæsthetist seated in cabinet with door open. Hand on regulation of escape valve. Ear piece in position. Rubber glove lying over cover to pump box. Note rheostat and switches.

as the conditions within the thorax may indicate, by moving the lever with a sterile towel. Or he may speak to the etherizer, who can regulate the same escape valve from within the cabinet. In Fig. 3 the etherizer's right hand is resting on the inside lever. I have found it most convenient to tell the anæsthetist at different stages of the operation how many centimeters of water pressure to produce on the manometer reading. He, being familiar with all the workings of the apparatus, has made these changes in pressure either with the escape valve alone or by a combination of the latter with an alteration in the speed of the pumps. Dr. Freeman Allen, who has anæsthetized the cases, has kept the pumps running at low speed with the escape valve wide open at times when no pressure was indicated. In this way he provided an ideal ventilation of the cabinet itself to his own advantage and that of the patient.

Fig. 2 shows the back of the apparatus. The door is also of sheet metal supported with a frame of square $\frac{3}{4}$-inch iron. The sill is lined with a strip of rubber ($\frac{1}{4}$-inch), against which the door frame is forced by the refrigerator locks which are shown in the photograph. These locks being double, the anæsthetizer can open or close the door from the inside at will.

There are four brass handles on the front and back of the cabinet by which it can be easily trundled into position.

The essentials of the inside of the chamber are shown in Fig. 4 and in Fig. 3. There is room enough for two to be seated. The stool now used is adapted to the height of the patient's face as regulated by the adjustment of the sliding hood on the front wall. The rest for the patient's head, represented in the photograph by a plain round plate, has been upholstered with sheepskin in the form of a doughnut shaped pad. This head rest can be moved forward, back, and laterally to render access to the patient's face with ether cone or chloroform mask. A shelf is provided at the etherizer's right for bottles, ether cans, etc. In the upper left corner is the inner door to the air lock referred to above. Above and to the left is the escape valve with its regulating lever.

I have avoided the use of the electric telephone for communication between the operator and anæsthetist, for two reasons. In the first place, it has not been entirely satisfactory in the negative pressure cabinets, partly because the vibrating diaphragm has been hampered in its movement by the unequal pressure on its two sides. Furthermore, with an electric telephone, complications arise which in seeking simplicity I have tried to avoid. The acoustic connections in this apparatus are on the speaking tube plan. As may be seen in the interior view (Fig. 4), one tube leads from the front right aspect to the cabinet up and across the ceiling to the center over the etherizer's head. A Y-connection with wired rubber tubes leads to two light metal ear caps to which are attached soft rubber collars such as are sometimes applied to the hard rubber telephone receivers. These ear pieces are held in posi-

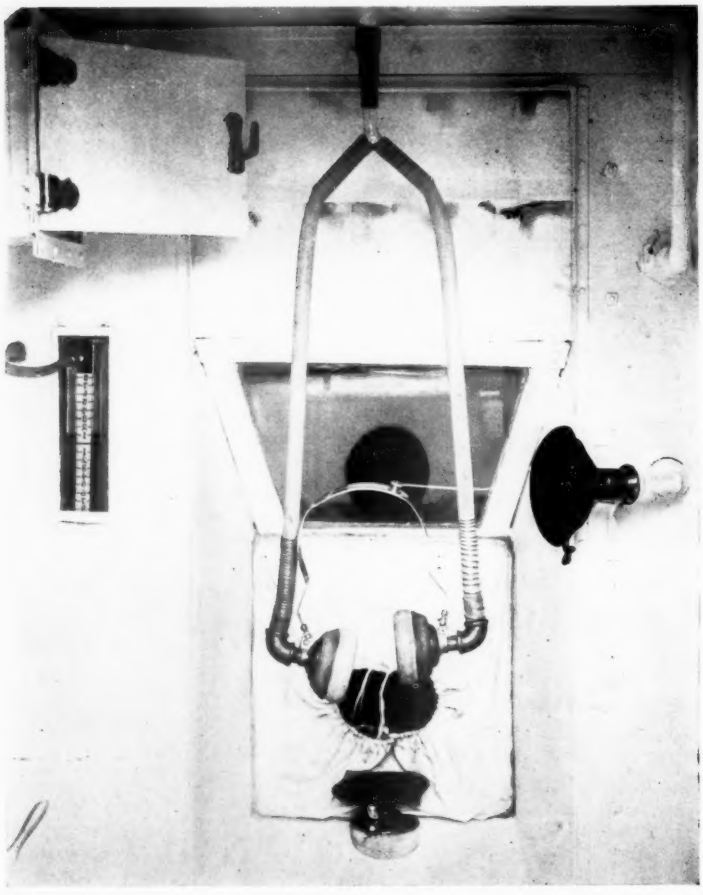

Fig. 4. Front wall of cabinet from the interior. Inner door of air lock open. Shows speaking tube system. Water manometer. Head rest (not padded), inner thin rubber collar with purse string.

tion by the usual spring clasp over the head, and when the pressure is rendered plus, the soft rubber covers are squeezed tightly against the sides of the head, preventing the escape of air through the tube and also cutting out all noises but voice sounds coming from without the cabinet. When the ear pieces are not in position and the pressure is raised to a level of five to six cms. of water, one experiences a sensation of slight pressure on the ear drums, which increases in proportion to the rise in pressure. Although this sensation may be obviated by swallowing occasionally, the ear caps insure more normal feelings, the tympanic membranes being exposed to the atmospheric pressure. In order to leave the hearing apparatus undisturbed, the speaking tube is separately constructed with its own megaphone on the outside of the cabinet. After opening a valve in the tube near him, the anæsthetist may put his face in the mask and speak without permitting the leakage of air. A similar valve in the tube leading to the ear caps may be closed when latter are not applied, although when left open, the pressure in the cabinet will only fall 2 mms. of water from a level of 9 cms.

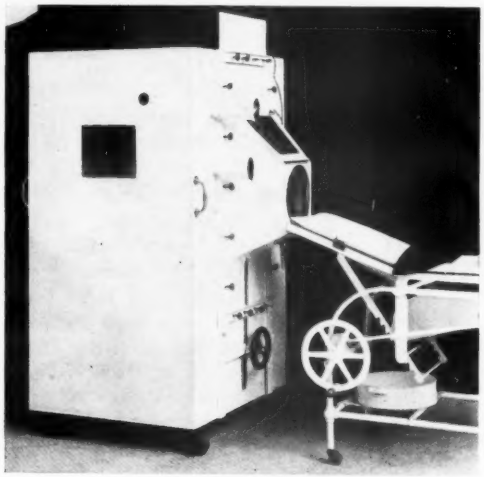

Fig. 5. To show partial elevation of adjustable hood. Opening of air exhaust on right wall, with valve lever.

Two large cylinders, one of oxygen and one of compressed air, may be placed in the back corners of the cabinet on either side of the etherizer. The oxygen he may use at will in connection with any form of any anæsthesia, leading it directly to the ether mask. If either of the ventilating pumps should suddenly fail to operate, the pressure in the cabinet may be maintained by opening the compressed air tank into the chamber, regulating its escape in the usual way and varying the pressure by controlling the exhaust valve in the right wall of the cabinet.

The contents of the pump-box are shown in the drawing (Fig. 6). Although the capacity of either pump run at full speed is sufficient to provide the required pressure, two were employed in case of accident to one, and furthermore, because with both running at moderate speed, the desired pressure is reached with less work to either motor, and with less noise due to the diminished number of rotations of the fans. The motors, switches, and rheostat are so wired that one or both pumps may be started, the rheostat controlling the speed in either case. The forward switch connects with the electric light on the window of the hood.

The problem of providing pumps to such forms of apparatus is not a simple one. If the pumps are to be run at some distance from the cabinet, perhaps in an adjoining room or in the basement below, high pressure pumps must be used to overcome the resistance of the tubing leading to the cabinet. Such high pressure pumps are friction pumps tending to overheat and necessitating constant oiling and care. They are heavy and expensive. Ventilators such as are shown here must be adjacent to the pressure area, for although of large volume, the pressure is not far in excess of that required for inflation of the lungs. They are built on the fan system, they are frictionless, and make little noise. They require low horse power motors and are less expensive than the high pressure pumps. I think there is no question that these are the preferable form of pumps for positive or negative pressure apparatuses.

One wire connection between the pump box and a neighboring lamp socket is all that is required in preparation for the use of the pumps. The cost of the complete apparatus was in the neighborhood of $300.00. Although greater in bulk, it is evident that the parts are simple and durable, and its mechanism uncomplicated. I have come to operate thoracic cases with the patient's head within the cabinet, whether the pressure is a probable necessity or not. The operation and anæsthesia are therefore carried on in the usual way, and at any indicated moment the pressure may be applied.

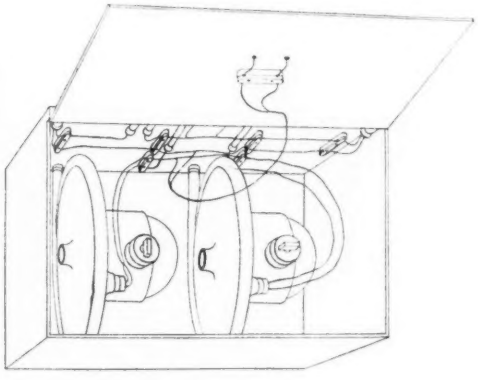

Fig. 6. Interior of pump box showing ventilators, motors and wiring.

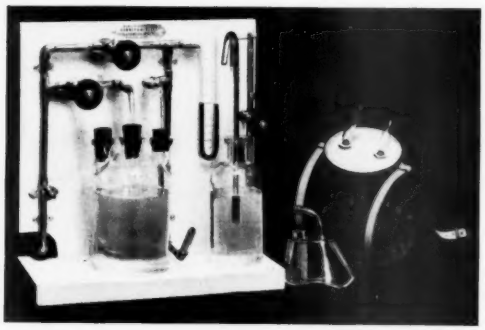

Fig. 7. Portable and animal apparatus (remodeled), see text.

Even if the operation is started without the head in the cabinet, the latter may be applied in a moment's notice.

The portable apparatus shown in remodeled form in Figs. 7 and 8 differs from the apparatus described in this journal a year ago in several respects. The drop method ether chamber has been abandoned because its usage required constant attention by one person, and furthermore, because the stage of anæsthesia produced by the simple passage of the air through the ether bottle, was so unvarying and satisfactory that the drop method did not seem essential. In fact, the constantly renewed "fresh air" from a pressure blower such as is used in this apparatus, provides a combination with ether fumes not unlike the combination produced the commonly used drop method. There is never the least indication of overanæsthesia nor of a lack of oxygen. Another change is in the mechanism of raising and lowering the exhaust tube in the water column. This tube is now of metal and is moved by a rack and pinion gear. The cocks in the apparatus, which were originally rather inaccessible, have in the new apparatus been extended into the foreground and provided with wheel grips.

This small apparatus has continued to serve admirably as an automatic etherizing and positive pressure machine. In a large series of operations no assistant has been sacrificed to administer anæsthesia because of the simple control of the same by the operator without breaking asepsis.

In a paper read at Chicago before the Surgical Section of the American Medical Association in June, 1908, I referred to the administration of oxygen through the trachea to the bronchial bifurcation; also to a similar deep introduction of air to the same point. The idea of so using oxygen was suggested to me by Dr. Sollman of Cleveland and by the publications of Volhard. I was interested to substitute air to see if oxygenation of the blood could be maintained with the lungs in a state of collapse. I found in my experiments that deep intratracheal administration of oxygen would maintain the normal pulse rate and respiratory movements in spite of removal of the front of both chests and in the presence of almost complete collapse of the lungs. In substituting air under the same conditions, I found that it was necessary to keep the lungs

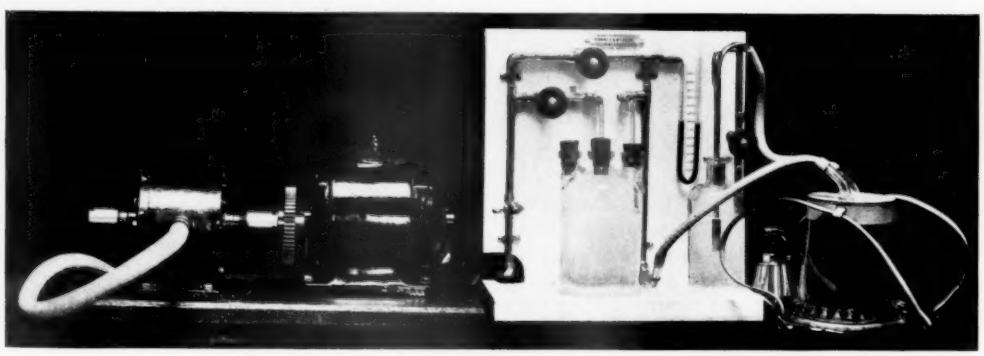

Fig. 8. Portable apparatus complete with pump and motor.

at almost full inflation. In other words, aside from the necessity of passing a tube to the bifurcation of the bronchi, which is a procedure of considerable difficulty in the human, though simpler in the dog, I could see no advantage in the method for practical purposes over the simpler use of a mask, as is shown in this small apparatus, or in the application of a peroral intubation tube such as I described in 1909. Meltzer and Auer have since utilized this intratracheal air method. That the lungs may be so inflated with sufficient air exchange as not to disturb the circulatory functions, I became convinced in my experiments in the physiological laboratory of Professor Cannon at the Harvard Medical School in the spring of 1908. Had I then believed that this method would ever substitute the mask or cabinet method, either in the human or in animals, I should have continued with it. But reminded by the throat specialist of the difficulty in introducing and maintaining instrumentation within the deep trachea, I look with grave doubts on the application of this method to the human. And knowing that the simplest mask method without irritation of the air passages is equally efficient in experimental thoracic surgery on animals, I am not convinced that there is any advantage in the so-called Meltzer-Auer method.

It would be the height of folly to allow discussion as to the priority of ideas to interfere with the perfection and application of any form of differential pressure which may aid us in our attack on the so-called inoperable lesions within the thorax. I have described two forms of apparatus as my feeble contribution to this cause, hoping that they will be superseded eventually by machines, methods, or devices of greater usefulness.

DIVERTICULITIS OF THE SIGMOID[1]

Report of a Case

By J. HENRY BARBAT, M. D., San Francisco, California

WHILE there has been considerable work done regarding the etiology of acquired diverticula of the intestines, there have been comparatively few positive cases of diverticulitis recorded. In a very complete article, W. H. M. Telling, of Leeds, gives short histories of 105 cases of diverticulitis, a large number of which, however, had been reported originally as some other condition. Brewer, in a recent article, gives a report of the first case of operation for diverticulitis before perforation, in which the diagnosis had been previously made. It was the second attack in the same patient, the first one having been operated upon after rupture. The reason for this apparently small number of reported cases of diverticulitis is undoubtedly due to the fact that the condition is not discovered either before or after death in a large number of instances.

Cases of left-sided abdominal abscess, followed by fæcal fistulæ, are unquestionably due to perforative diverticulitis. Several instances of vesicosigmoidal fistulæ have been reported due to ulceration of sigmoidal diverticula. Operators have been pleasantly surprised on many occasions to find patients recover after operation for apparent cancer of the sigmoid, in which the mass may or may not have been removed. These are also cases of diverticulitis. According to autopsy reports, acquired diverticula are found in varying proportions; the Johns Hopkins statistics giving one to every 72 autopsies, while the records of the City Hospital of Dresden give only one to every 1,162 autopsies. This apparent dis-

[1] Read before the San Francisco County Medical Society.

Microphotograph of diverticulum showing extreme thinning of wall, ready to perforate.

crepancy can only be accounted for by assuming that acquired diverticula were overlooked in many cases, and this would be easy to understand, because little pathologic interest was attached to these until recently, and unless especially looked for would not be noticed.

Martin Fisher, in a monograph on acquired diverticula, reviews the etiology, and concludes that they are due to several factors. First, the local weakening of the intestinal wall, especially at points of entrance and emergence of large blood-vessels. Intraintestinal pressure while undoubtedly a factor, can not be considered, in the light of experimental research, as a predisposing cause. A history of constipation is usually obtained in cases of diverticulitis. Age is an important factor, and Beer finds that old people are more liable to have muscular deficiency in the gut wall. Graser states that persons who have mesenteric venous stagnation are more subject to diverticula. Most cases of diverticula are in persons who are, or have been, obese.

They are found more frequently in the sigmoid and descending colon, but they have been found in all parts of the intestine, even the appendix.

The diagnosis of diverticulitis before rupture and peritonitis will undoubtedly become more common, as medical men keep before them the fact that diverticula of the intestines, and especially of the sigmoid, are not as rare as the older articles on the subject would indicate. Most diverticula of the large intestine contain fæcal concretions of varying hardness. With this knowledge, it is not difficult to figure out the pathologic possibilities. Telling gives the following summary of secondary pathological processes to which sigmoid diverticula are liable:

1. Infection of general peritoneal cavity from thinning of the sac wall without perforation. 2. Acute or gangrenous inflammation (diverticulitis). 3. Chronic proliferative inflammation with thickening of gut wall, and stenosis of the bowel. 4. Formation of adhesions to small intestines or bladder. 5. Perforation of diverticula, causing general peritonitis, local abscess, submucous fistula of gut wall, or fistula into other cavities, bladder, etc. 6. Lodgment of foreign bodies. 7. Chronic mesenteritis of sigmoid loop. 8. Local chronic peritonitis. 9. Metastatic suppuration. 10. Development of carcinoma. 11. Perforation into hernial sac.

The uncertain location of diverticula makes the diagnosis of infinitely greater difficulty than that of appendicitis. The majority of them being near the mesenteric border, and the patients obese, inflammation or perforation takes place inside of a mass of fat, and the symptoms are obscured until the peritoneum is reached; because the mere perforation of the gut does not cause pain *per se*, and it is only after the peritoneum is either inflamed or stretched that pain is elicited. If the diverticula are covered by peritoneum without the intervention of fat, an early diagnosis may be made and correct treatment instituted.

"Left-sided appendicitis" is a terse way of describing the usual symptoms of diverticulitis, but it must be borne in mind that the symptoms require even more careful analysis when on the left side than when on the right, because we are more uncertain as to the existence of diverticula in any given case than of an appendix. The sudden onset of pain, localized tenderness, and rigidity of the left rectus muscle should suggest the probability of diverticulitis, and as in appendicitis of this type an immediate operation. Secondary processes must be dealt with according to the pathology present.

Prognosis, of course, as in appendicitis, depends on the time which elapses between the onset of the disease and the arrival of the operator. The difficulties which we are going to encounter in treating diverticulitis are going to be the same which were met twenty years ago in treating appendicitis. The abdominal surgeon must convince the medical man that diverticulitis is much more common than is generally supposed, that its early recognition and correct treatment give a good prognosis, and that delay is often fatal.

I believe that every practitioner of experience can look back and see a number of cases which, if analyzed in the light of our present knowledge of intestinal diverticula, were undoubtedly due to diverticulitis and some of its numerous complications. Up to the present time the majority of cases have been seen only after perforation and abscess formation, and as in appendical abscess, opening and drainage are indicated, but we must bear in mind the greater probability of fœcal fistulæ following diverticular abscesses. If practical, the opening in the gut should be closed at the time of operation; and if the peritonitis is diffuse it is imperative that it should be done, otherwise it is impossible to carry out the proper post-operative treatment, as my case illustrates. When the patient is in fit condition and there is more than one diverticulum, which is usually the case, resection of the sigmoid should be done with end to end anastomosis, as in cases reported by W. J. Mayo.

Where stenosis of the bowel from inflammatory infiltration is present, resection is indicated. If the patient's condition will not warrant an extensive operation, colostomy, followed by subsequent resection, will give the best result. In both pre- and post-operative treatment, high enemas must not be used, on account of the danger of forcing the fluid through an opening in the gut. In cases of vesicosigmoidal fistula the viscera should be separated, the edges of the fistulous openings pared, and the openings closed with at least two layers of stitches. Drainage should always be provided after resection or the closure of fistulæ, but the drainage material must not be in contact with the line of suture.

While I have contributed nothing new to this subject, I trust that by calling your attention to the frequent existence of this extremely fatal disease, you will be more watchful for it in the future.

HISTORY OF CASE

J. T., aged 56 years. Family history good; no deaths from abdominal disease. In September, 1906, he had "chills and fever," which was found to be due to a cystitis. At Dr. Grosse's suggestion I did a suprapubic cystostomy, followed shortly afterwards by a resection of one inch of the urethra, which had a tortuous impassable stricture. He recovered fully after this and began to take on flesh. Three weeks before I saw him in his last illness, he noticed a pain in the abdomen more toward the left side, just below the umbilicus. The pain, which was at first of a boring character, became intermittent and colicky, and after two weeks he was obliged to remain in bed. He lost his appetite and the bowels, which had been previously regular, became constipated. At the end of the third week, he had complete obstipation, the abdomen was distended, he vomited everything introduced into the stomach, and presented a classical picture of a mechanical ileus. When I first saw him, he was tossing about in the bed, his face bore an anxious look and indicated intense suffering. On examination the abdomen was found very much distended, and tender over its entire area, with marked muscular rigidity. No mass could be made out, and percussion gave a tympanitic note over the whole abdomen. Examination with sigmoidoscope showed the lower bowel to be absolutely empty, and no sign of inflammatory spot could be seen.

Several high enemas had been given and brought away three or four small spherical masses of hardened fæcal matter, which were undoubtedly dislodged from some of the diverticula subsequently found in the sigmoid. The abdomen was opened the same day, and a quantity of seropurulent fluid ran out, but no intestinal loops protruded, on account of general adhesions, which were evidently causing the obstruction. The adhesions were rapidly loosened, but no atrium of inflection discovered, and not wishing to prolong the operation, a drainage tube was placed in the lower angle of the wound and the abdomen closed. The patient was placed in Fowler position, and Murphy's continuous proctoclysis given. In view of the pathology subsequently found, the proctoclysis was undoubtedly an error, and rather diminished than improved the patient's chances of recovery, as a large amount of the fluid found in the abdomen at autopsy was probably a part of the saline solution which entered through the perforated intestine.

On the third day after operation a small quantity of fæcal matter came through the drainage tube, in addition to the large amount of serum discharge which continued till the day before death. The vomiting and distention of the abdomen continued in spite of all treatment, and the patient died on the sixth day after the operation.

AUTOPSY REPORT

Partial necropsy twelve hours after death. Body of well nourished man. Abdomen very much distended and tympanitic. Abdominal wall, omentum, and mesenteries loaded with fat. The abdominal cavity contained a large quantity of seropurulent fluid. The intestines were injected, lusterless, and glued together with fibrinous exudate, which had caused obstruction of several loops of both ileum and jejunum. Appendix normal. The intestines contained besides a considerable quantity of gas, a large amount of yellowish green watery fluid. Separation of the intestinal loops disclosed a dirty gray sloughing mass of fat at a spot corresponding to the junction of the anterior layer of the mesosigmoid and the root of the mesentery. Pressure near the sloughing area caused fluid of the same type as was found in the intestine, to exude. The opening was traced down for 2 inches behind the anterior layer of the mesosigmoid, and a perforation of the sigmoid disclosed. The colon, sigmoid, and rectum were removed and sent to the pathologist. The other abdominal organs appeared healthy.

PATHOLOGIC REPORT

The specimen in this case is one of the sigmoid sixteen centimeters long; between the layers of its attached mesentery is a mass ten centimeters in diameter, consisting of greatly infiltrated fatty tissue, connective tissue, and enlarged glands, giving very much the clinical picture of carcinoma. On opening this mass, the central cavity was found to be directly continuous with the lumen of the intestine, by a small perforation located near the attachment of the mesentery. Within the cavity was a turbid serous fluid, a fæcal concretion corresponding in size to the perforation, as well as unshaped fæcal matter. On longitudinal section of the gut opposite its mesenteric attachment, twenty-six well formed diverticula were found, one of which was perforated; the perforation corresponding to the opening previously spoken of. The diverticula varied in size from that of a grain of wheat to that of a large pea, were arranged longitudinally, and located immediately within both attachments of the mesentery. The mouths of the diverticula were closed by labia of mucous membrane, making the entrance to each individual diverticulum smaller than its distended distal portion, and rendering their discovery extremely difficult, unless specially looked for.

The perforation and one of the diverticula were removed for microscopic examination, cotton was inserted into a number of the diverticula, and the specimen put through Kaiserling.

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DEPARTMENT OF TECHNIQUE

THE SURGICAL TREATMENT OF EXOPHTHALMIC GOITER

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ANYONE who has had an opportunity to observe the results which follow the surgical treatment of exophthalmic goiter must confess that it is the best treatment for this disease in nearly every case. The internist may prefer to adhere to the medical treatment, and in support of his belief numerous cases can be cited where the results have been most satisfactory. On the other hand, every practitioner has seen cases in which every form of treatment, except surgical, has proved ineffectual, and when finally surgical treatment was resorted to, a cure, or, at least, most marked improvement, followed.

It would be rash to say that every case of exophthalmic goiter is suitable for surgical treatment, because it is not. There are cases in which surgery has failed even to give the patient relief, but that may be said of any form of treatment, not only the surgical. Most authorities are agreed that in those cases where surgery has failed to produce results it was not the fault of the operation, but the fault of too late an operation being performed. Surgical treatment should not be considered a last resort, but should be looked on in the same manner as the medical treatment is regarded — as a form of treatment, and not as the last thing to be attempted, in the hope of giving the patient relief. An early operation, a careful operation, done by an experienced operator, and not by an occasional operator, are essential to success.

The best results from the surgical treatment of exophthalmic goiter are obtained by the men who are most competent to perform this operation, and this statement is borne out by a review of the results published by Kocher, who has, without question, performed the operation more often than any other surgeon. His results, however, are corroborated by other operators of note, such as Ferguson, the Mayos, and Halsted, whose mortality is not over five per cent. Most of the patients operated on by these men have made a complete recovery, a few have received only temporary or partial benefit, while a very small percentage have not been benefited, or they have had a recurrence of the disease. However, a comparison of these results with the results obtained from medical treatment will show a balance in favor of operation. The operative mortality is exceedingly small, and in most instances it must be ascribed either to inadvised operation, as in the very acute cases, or where the patient's condition was such that immediate operation was absolutely contraindicated.

It is well known that in some cases the disease develops with startling rapidity and severity. In the short period of three or four weeks the patient manifests to a marked degree all of the cardinal symptoms of the disease, and it is in cases such as these that early operation is contraindicated. If the symptoms in these cases do not yield to suitable preparatory treatment, such as rest and quiet, diet and hygiene, an operation sometimes is performed in the hope that the patient will be relieved. These patients recover promptly after the operation, although in a few instances the case ends fatally. It is extremely probable, however, that recovery would not have ensued without operation, and, therefore, the operation must be considered justifiable, and the result in no way militates against the desirability of operation.

Other cases in which operation is contraindicated are those in which there exists a cardiac lesion, cases of such long standing as to have produced a severe nervous disturbance, especially delirium, where there is present a degenerated heart muscle, irregular pulse or low blood pressure.

OPERATIVE RESULTS

A most valuable paper, to which brief reference may be made at this time, is that of A. Kocher.[1] Out of 3,460 operations done for goiter in his father's clinic up to that time, 315, or a little less than ten per cent, were done on 254 patients afflicted with exophthalmic goiter. There were only 9 deaths (3.5 per cent) in this series, only one of these occurring in the last 91 operations. All of the patients were benefited; 83 per cent were cured. Kocher emphasizes that patients with a low blood pressure should be watched and prepared carefully for operation, and should never be subjected to an immediate extensive operation. If

[1] Jour. A. M. A., October 12, 1907.

there is not an increase in the lymphocytes, the case is a serious one. In one early undeveloped case and in cases of long standing, Kocher found such an absence of lymphocytes. In not one of Kocher's cases was the patient not benefited in some way.

Krecke [1] operated on seventeen cases, and comments on the fact of how quickly the nervous symptoms subside after the operation. In 888 operations collected by him from five different clinics, the mortality was nine per cent. In one point his experience does not coincide with that of other operators. He has not seen the exophthalmos subside entirely in any case. Eleven patients operated on more than two years ago have been in excellent health ever since. In common with other surgeons, Krecke urges earlier resort to surgery and careful examination for a persisting thymus.

Klemm [2] had no operative mortality in thirty-two cases. After eight years twenty-five patients are still cured; one improved; one not improved; five untraceable. He operates in one sitting, excising the half of the thyroid which is most involved, and ligates the vessels on the opposite side.

Garré [3] operated on thirty-five patients, twenty of whom were traced five years afterward. The exophthalmos had disappeared in twelve, lessened in three, remaining unmodified in five. The tachycardia had disappeared in four cases. Nervous disturbances were still apparent in all the patients. Ten were in excellent health. Statistics compiled by him from various clinics showed 85 per cent of the patients cured or markedly improved. He calls attention to a very important point, namely, the search for a persistent thymus in all these cases. He found it present in 77 per cent out of 56 cases that came to the autopsy table.

Riedel [4] operated on 80 patients. Six died from bronchopneumonia out of the first 50 cases; one died from chloroform narcosis. Only one patient died from bronchopneumonia in the last thirty cases. The chief danger, he says, is from waiting. Early removal of the gland is urged, even though it may be only slightly enlarged.

In March, 1909, Kocher reported 320 cases, with eleven deaths (3.44 per cent). Since 1906 he has performed 153 operations, with only two deaths (1.5 per cent). This mortality is not much greater than that of ordinary goiter, among which during the last six hundred operations, he has had three deaths (0.5 per cent).

McCosh performed twenty-three operations with one death. Of nineteen patients traced, four were apparently cured at twelve, eight, seven, and four years respectively after operation. Twelve patients operated on during the past year are improved. Two patients, although benefited very much, still suffered from nervousness and tachycardia on exertion. Only one patient had not been benefited.

Dunhill performed thirty-two operations on twenty-five patients, with only one death. Only one of the patients was not improved by the operation, and it was noted in this case that while the wound was draining to the surface, the patient did well, the pulse being 80, but when the wound healed, the pulse increased in frequency and the associated symptoms returned.

Charles Mayo has had a mortality of five per cent in the last two hundred operations. Of 167 patients traced, 70 per cent were improved, cured, or greatly improved, and 94 per cent were cured, improved, or somewhat improved.

It is apparent, therefore, from the citations given, and the list could be continued indefinitely, that with improved technique the mortality has been greatly reduced.

PREPARATORY TREATMENT

The necessity for thorough preparatory treatment has been emphasized repeatedly, and the importance of this statement can be appreciated only by those who have had occasion to perform this operation often. This is especially true in the advanced and rapidly developing cases, in which tachycardia and mental excitement are marked, and are likely to be aggravated by preparations for operation. It is in cases such as these that Crile's method of "stealing away" the gland is useful. As a rule, the sufferer from exophthalmic goiter is in a nervous state, which is very undesirable, no matter what operation is to be performed. Therefore, the patient should be placed in bed and kept absolutely quiet for at least a week prior to the operation. During this time suitable medical treatment may be employed, so that when the patient enters the operating room it is without fear or dread of the consequences. It is in such cases that the best results are obtained. The patient is placed on a restricted diet, although by no means a starvation diet, and Clemens' solution, ten drops three times daily, is administered, which Ferguson has shown to be particularly useful in these cases. Some surgeons prefer to give belladonna or atropine, others have used Fowler's solution and strophanthus, and still others have given minute doses of morphine. None of these, however, seems to be quite as effective as Clemens' solution.

[1] Krecke: Muench. Med. Wchnschr., January 5, 1909.
[2] Klemm: Arch. f. Klin. Chir., vol. 86, No. 1.
[3] Presse Med., February 26, 1908.
[4] Deut. Med. Wchnschr., October 1, 1908.

In Dr. Ferguson's service at the Chicago Hospital excellent results have been obtained from the use of chloretone, given either for several days before the operation or only on the morning of the operation. The chloretone, when given in the former way, is administered in five-grain doses, every three or four hours, and when given just before operation as high as fifty grains are taken within a period of two and one-half hours — twenty-five grains two hours before operating, fifteen grains one hour before, and ten grains one-half hour before. The result of this medication is that the patient is partly drowsy, is perfectly quiet, and not resistant. Some patients are brought to the operating table soundly asleep, and are aroused only with difficulty. Not only does it remove restlessness, nervousness and fear, but considerably less of the anæsthetic is required, which is always a most desirable factor in any operation. The patient is anæsthetized quickly, less anæsthetic is required to keep him under, the operation can be performed more quickly, and the post-operative results are better.

THE OPERATION

The various operations employed seem to have been equally productive of good results. The method most in use is the collar incision of Kocher, exposing the gland freely, removing as much of it as in the opinion of the operator is indicated, after ligation of the thyroid vessels and closing the wound according to the method of choice, inserting a drain for a few days. Free drainage must always be provided for by means of silkworm gut, a capillary or a glass drain, placed in the angles of the wound, or in the center, as is the custom of Kocher.

In severe cases the operation may be performed in several sittings. Preliminary ligations of the superior thyroid arteries are made, in order to limit the vascularity of the gland and to reduce the amount of thyroid poison taken into the general circulation. In pronounced cases, with good hearts, a unilateral excision of the larger and more vascular half of the gland, including the isthmus, is made. In many cases, the ligation of two or three arteries and veins gives equally good results with removal of half of the gland. The removal of more than half of the gland should not be considered, except in rare cases.

The important principles in the operation are to avoid unnecessary handling of the gland, to check hæmorrhage promptly, no matter how slight, to be particularly careful not to remove the parathyroids, and to provide for suitable drainage.

Some surgeons have employed what might be termed a subcutaneous ligation of the vessels without exposure or removal of the gland, but this procedure must be limited to those cases that are particularly suitable for operation, that is, where the gland is not large or where only one lobe is involved, where the symptoms are very mild in severity, and where the patient is not suffering greatly from the thyroid toxæmia; in other words, where extensive surgical intervention is contra-indicated or unnecessary.

In the typical case of exophthalmic goiter more extensive measures must be employed, and it is here that the procedure outlined above is indicated, and is productive of the best results. Ferguson employs the intracapsular ligation of the vessels, thus removing almost entirely all risk of injury to the parathyroids, because, as a rule, these glandules are situated outside of the thyroid capsule. When found within the capsule, it is usually in the posterior part of it, so that by avoiding injury of that portion of the capsule, one need not worry about the parathyroids.

TETANY

Formerly, before the physiologic importance of the parathyroids was fully appreciated, tetany followed in very many cases of thyroidectomy. Now, however, tetany occurs but rarely. In 700 cases operated on by the Mayos, not a single case of tetany occurred. Only those who have seen a case of tetany can be fully alive to what it means, and will strive always to avoid removing the parathyroids. However, the intracapsular ligation method of Ferguson and the habit of staying away as much as possible from the posterior capsule of the gland give reasonable assurance of not interfering with the parathyroids in any way. Of the many points to be borne in mind in performing a thyroidectomy, avoiding the parathyroids is by no means the least.

Where the disease was so advanced as to necessitate complete removal of the gland, Kocher has transplanted parathyroids with fairly good results, in one case the transplantation having been made into the tibia. Such extreme measures, however, are rarely indicated or necessary; usually only a portion of the gland need be removed. Ferguson removes all of the gland except a small button at each corner, which leaves sufficient thyroid tissue to obviate the occurrence of unpleasant symptoms afterwards. His results have shown the value of this procedure.

All hæmorrhage should be checked promptly; bleeding points, no matter how small, are ligated, and oozing may be checked either by pressure or by gently swabbing with Harrington's solution.

For ligature material catgut or very fine silk may be used, according to the choice of the operator.

Either a small or a large dressing may be applied. In favor of the large dressing stands out prominently the one fact that in all of these operations there is considerable oozing afterward, and by applying a sufficiently large dressing, the so-called mammoth dressing, the fluids are absorbed quickly, and it will not be necessary to disturb the patient for at least twenty-four hours afterwards, when the drain is removed, either wholly or in part, and a fresh dressing is applied.

AFTER TREATMENT

The after treatment is important. Of prime importance is supplying the patient with a sufficient amount of fluids, preferably water, and next is the enforcement of absolute quiet. It is remarkable how well these patients do. Relief is apparent in many cases within two or three days after the operation, and in every case the patient is able to be up and around within a week or ten days. The tremor has disappeared, there is no more headache or gastrointestinal disturbance of any kind, and even the exophthalmos, when present before the operation, is often unnoticeable. The general condition of the patient also improves rapidly, sometimes to a really astonishing extent. In two cases operated on by Dr. Ferguson the patient gained in weight one pound a day for forty days. The patients felt well, and when last heard from were still in the best of health, without any recurrence of the thyroid disease. Of 55 patients operated on by Dr. Ferguson at the Chicago Hospital within the last few years, four have died; the remainder are in excellent health. One case was of the most severe acute type. Symptoms of the most aggravated form developed suddenly, and operation was performed after six weeks of ineffectual medical treatment, in the hope of benefiting the patient, in some measure, at least. The second case was one of long standing. Two patients were moribund when operated on and operation was performed under protest — at the insistence of the patient's family and friends.

ANÆSTHESIA

With reference to the method of anæsthesia: Mention has already been made of the use of chloretone preliminary to the operation, for the purpose not only of quieting the patient, but to promote safer anæsthesia. Ether appears to be the anæsthetic of choice when general anæsthesia is desired. Many surgeons, however, prefer to operate under local anæsthesia, notably Kocher. Advantages are claimed for both methods. The general anæsthetic ensures absolute quiet on the part of the patient and eliminates a certain element of dread on the part of the operator that the patient may be suffering. For the local anæsthesia it may be claimed that the co-operation of the patient is secured, the shock is lessened, there are no post-operative symptoms, and otherwise the results are in every way the equal of those secured from general anæsthesia. So that the choice of method is largely what one has been in the habit of doing, and what has, therefore, yielded good results.

DIRECT IMPLANTATION OF BONE GRAFTS

By C. C. ALLISON, M. D., Omaha, Nebraska

The use of freshly prepared bone grafts for purposes cosmetic, or as an aid to the reconstruction of bone, seems to have promise of a more extensive application in the future than in the past, as the following clinical report will indicate:

L. N., aged 6, from lack of development of the body of the left inferior maxillary bone, presented a facial deformity so great that the parents sought relief from surgical measures and were willing to fully share the responsibilities of such an effort.

After paraffin injections had been discouraged by those experienced in its use, we consented to expose the toothless periosteal band, representing the body of the inferior maxilla, which proved to be a rather well developed membrane, over an immature alveolar process, and make an effort to implant beneath it a segment of bone taken from a chicken, which had been killed during the preliminary steps of the operation.

The thigh bone of the chicken was split and brought into the required shape by a file, then dropped into normal salt solution for one minute before implanting beneath the periosteum. The periosteum was closed over the bone graft with number one plain catgut, and the wound in the soft parts, which had been made below the margin of the undeveloped lower jaw, was closed without drainage. Besides the usual assistants, there were present at the operation, Dr. J. Ford Thompson, of Washington, D. C., Dr. Geo. Shiley, of Candle, Alaska, and Dr. E. D. Cummins, of Plattsmouth, Nebraska.

We were somewhat surprised and much gratified to find the wound heal without reaction, and the contour of the bone graft plainly evident.

The operation was done June 24, 1909. This operation seemed entirely successful at the end of three weeks, and if it were permanently so, it was apparent that another graft a little higher, and somewhat anterior, would greatly contribute cosmetically, toward lifting up the receding tissues below the angle of the mouth, and toward the mental symphysis.

The case was therefore directed to return after three months, to determine from the degree of success the possibility of a second attempt at further correction of the deformity.

Examination upon her return, September 20th, found the original bone graft to occupy the position in which it had been placed, its size undiminished, and the surrounding tissues healthy.

The old scar in the soft parts was again used in exposing the field for a second graft to be placed a little higher and more anterior than the first.

We were encouraged to find, upon exposing the first graft, that it was firmly fixed. The periosteum was stripped back with about the usual effort and a second graft was implanted.

Following this effort, there has been uncomplicated wound healing, the condition of the soft parts seem normal, and the deformity is practically overcome.

Our experience in this case would lead us to believe:

First, that fresh bone grafting will require periosteal support in order to secure the fullest measure of success.

Second, that the porous bone of the available chicken is probably the most suitable one for grafting.

COMBINED TRANSVESICAL AND EXTRAPERITONEAL METHOD FOR REMOVAL OF STONES FROM LOWER END OF THE URETER

By MAX BALLIN, M. D., Detroit, Michigan
Attending Surgeon, Harper Hospital

"Calculus at or near the vesical orifice of the ureter may be reached in a variety of ways. If the stone is within the bladder wall, bulging the mucous membrane, or projecting into the vesical cavity, it may be extracted by a transvesical route. Dilatation of the urethra in the female, suprapubic cystotomy (Morris prefers perineal section) in the male, permits the removal of the stone by divulsion or incision of the ureteral orifice, perhaps aided by the lithotrite or scoop. When the stone lies outside of the bladder, low down in the pelvis, it is singularly inaccessible. Sometimes it may be reached by an incision in the vault of the vagina — risking uretero-vaginal fistula. Such a stone has been reached by a transverse perineal incision. (Hurry Fenwick.) The rectal route presents obvious objections. Morris has successfully operated by the sacral route. But usually the line of attack has been intraperitoneal or inguinal. These last two routes are probably preferable."

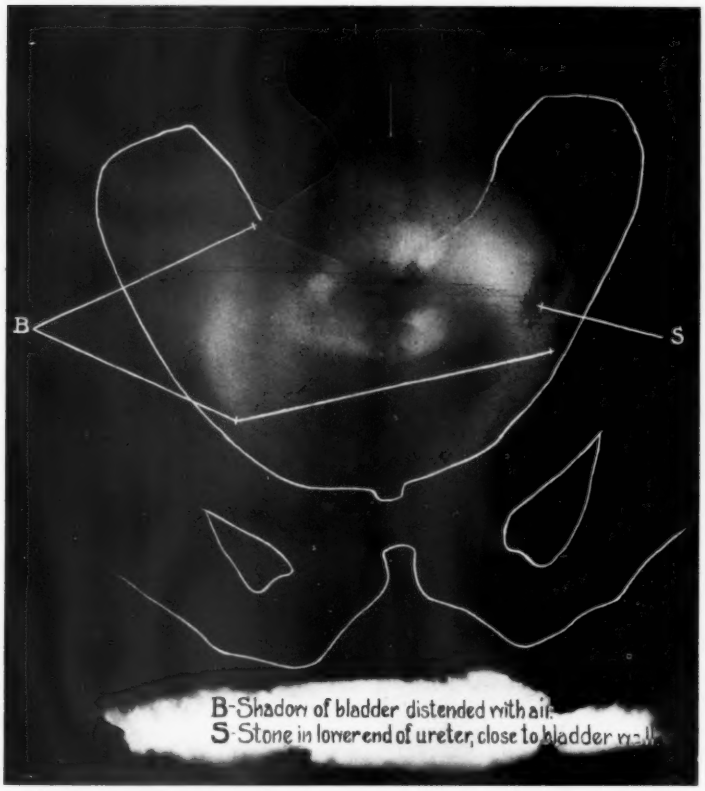
This statement from Keyes, in his text-book on genito-urinary diseases, explains the different methods in use for removal of stone from the lower end of the ureter.

With all these methods, every surgeon of some experience in this particular line of surgery, knows how impossible or at least how very difficult it is at times to remove a stone lodged in the lower end of the ureter. The author himself knows of two cases where the operation was simply discontinued after opening the bladder, on account of inability to dislodge the stone.

The following case was met with in our practice and we were confronted with the impossibility of removing the stone through a suprapubic incision. Therefore, we employed a combined method adding to the suprapubic incision in the bladder, an extraperitoneal one that rendered the removal of the stone surprisingly easy.

We will give briefly the history of this case, and at the same time the technique of the operation:

Mr. J. S., 27 years old, consulted me first on February 15, 1908. He gave the history of having had gonorrhœa one year ago. His present illness began two years ago, with attacks of pain in the right lower quadrant of the abdomen. In the first attack he was sick in bed for four days. At this time a diagnosis of appendicitis was made, a mistake that to our knowledge has happened not rarely. Since then he has had four other attacks of the same character, sudden, sharp pain in the appendical region, radiating to the back and toward the right testicle. There was no vomiting and no fever with these attacks. During the last two months he has had many shorter attacks of



such pain; they were followed by frequent desire to urinate.

Examination of the patient: Mr. S. is a well developed, healthy appearing man. The only thing of note is that on palpation the region over the right kidney and ureter is tender and painful. His urine is cloudy, contains a trace of albumen, many pus cells, and a few red blood cells. On the 18th of February, a cystoscopic examination was made. A ureteral catheter could be introduced into the left ureter easily; the right ureter was swollen and reddened, and the ureteral catheter could not pass beyond a half inch from the ureteral opening. A radiograph taken by Dr. Hickey at this time showed a calculus in the right ureter low down in the pelvis. (See radiogram.)

Mr. S. was sent to Harper Hospital and operated the 18th of March, 1908. It was decided to remove the stone by the transvesical route, and the bladder was opened suprapubically. The stone could be easily felt and moved about with the bladder wall, but it could not be dislodged either upward into the ureter or downward into the bladder, in spite of long manipulation. It was also impossible to catch the stone by small alligator forceps introduced into the ureteral opening. Splitting of the ureteral opening was not deemed advisable, as it did not seem to be possible to overlook the field sufficiently if control of hæmorrhage was needed. From the fact that two fingers introduced into the bladder could move the bladder-wall with the stone in the ureter, freely in the lower pelvis, it occurred to me to make a small intraperitoneal incision and have my assistant push the stone from within the bladder with his finger toward the intraperitoneal incision. According to this idea a second incision two inches in length was made one inch above and parallel to the middle of Poupart's ligament, through skin, fascia, and muscle. The peritoneum was pushed inward, and after detaching the peritoneum a little more with a gauze sponge, the stone, embedded in the ureter, appeared in the wound, guided there by the two fingers of my assistant introduced into the bladder. It was easy to incise the ureter over the stone, it being

steadied in the wound by the assistant's fingers, and extract the stone, which was about the size of an olive pit. Both bladder and ureter were then drained. The wound closed in about two weeks. Patient was discharged cured three weeks after operation.

In conclusion this method seems to have many advantages. Even with all the modern instruments for transvesical operations many cases will be found like the one mentioned where the transvesical removal of the stone is impossible. The vaginal route could only come into consideration in the female, and then it is often followed by long standing fistulas. The rectal route does not correspond with our aseptic principles. "The perineal and sacral routes which have been recently devised for the removal of stones low down in the ureter are not to be considered." (Ransohoff in Keen's Surgery.) The extraperitoneal route alone, as every surgeon knows, requires a long, formidable incision to overlook the anatomy and the relationship of ureters to iliac and spermatic vessels well, and to reach the ureter lying deep in the small pelvis. From the experience in this case, I was very much surprised as to the ease with which the stone could be brought into a small extraperitoneal incision. While the original depth of the stone, if searched only by extraperitoneal incision, is between five and six inches, by this combined method the stone could be brought within two inches of the surface through an incision between two and three inches long. It would have been also possible to have stitched the ureter and bladder primarily, but on account of the long manipulation which had been gone through in trying to remove the stone by the transvesical route alone, we deemed it advisable to drain in this case. The accompanying sketch will illustrate clearly the technique of this method.

SOME POINTS IN THE OPERATIVE TECHNIQUE OF VAGINAL HYSTERECTOMY FOR PROLAPSUS

By THOMAS S. CULLEN, M. D., Baltimore, Maryland

It is not my intention to discuss here the relative merits of the various abdominal or vaginal operations for prolapsus of the uterus. Marked prolapsus usually demands operative interference. If the patient comes prior to the menopause, the uterus should be preserved if possible, and even in women who have passed the menopause it may sometimes be deemed wiser to save the uterus on account of the probability of a prolapsus of the vaginal vault at a later date. In a certain number of cases, however, there is marked prolapsus of the uterus associated with much redundancy of the anterior and posterior vaginal walls and occasionally with a greater or less amount of ulceration. In this group of cases vaginal hysterectomy combined with a wide removal of the surrounding vaginal mucosa, closure of the vaginal vault and repair of the perineum, as described in the following paragraphs, gives excellent results.

The accompanying case was the first in which we employed this procedure.

Vaginal hysterectomy with wide excision of the vaginal mucosa in a case of extensive prolaspus uteri with ulceration of the cervix and vagina.

Mrs. E. L., aged 72, white, seen in consultation with Drs. Chapman and McCormick of Trappe and Brice Goldsborough of Cambridge, Md., March, 1905. This patient for 52 years has been suffering from prolapsus of the uterus, but never told her physicians about it until a few weeks ago. Until recently she has gotten along without much difficulty.

Accompanying the prolapsus is marked descensus of the bladder. The cervix (Fig. 1) is greatly thickened and there are teat-like projections from its surface. A long scar seven or eight cm. in length extends up the right side of the cervix along the vaginal vault. On the left side is a similar but smaller one not completely covered over with epithelium.

Fig. 1. *Marked prolapsus of the uterus.* The cervix is much enlarged and springing from it is a teat-like projection more than 1 cm. long. On the right side of the cervix and extending far out on to the vagina is an area of ulceration. A similar but smaller one is noted on the left. On the anterior vaginal wall are two small ulcerated areas. The dotted line indicates the outline of the incision. It passes through the vaginal mucosa but no farther. After it has been determined just how much vaginal mucosa should be removed with the cervix, this incision is carried completely around the cervix. In this case all the ulcerated area was naturally included and posteriorly a flap of vaginal mucosa 7 cm. broad was removed with the cervix.

I outlined the area to be removed at the commencement by cutting just through the vaginal mucosa all the way around as indicated by the dotted line. I then dissected the vaginal mucosa downwards from the bladder, entered Douglas' cul-de-sac behind in order that I might get my bearings (Fig. 2), removed the uterus and joined the vaginal mucosa to the peritoneum of Douglas' pouch (Fig. 3). The peritoneum of the anterior pelvic wall was then sutured to that of the posterior wall, and in this way the pelvis was completely shut off (Fig. 4).

Path. No. 8459. The specimen consists of a prolapsed uterus together with a large cuff of vaginal mucosa. The cervix itself is 7 cm. wide, and 5 cm. in its anteroposterior diameter. Surrounding the cervix is a cuff of vaginal mucosa varying from 2 to 7 cm. in breadth.

In such a case as this one finger in the pelvic cavity is of the greatest assistance. After the area to be removed has been outlined and the vaginal mucosa has been carefully dissected downwards in front, care being taken not to enter the bladder, an incision is made behind the cervix and Douglas' pouch is entered. The left index finger

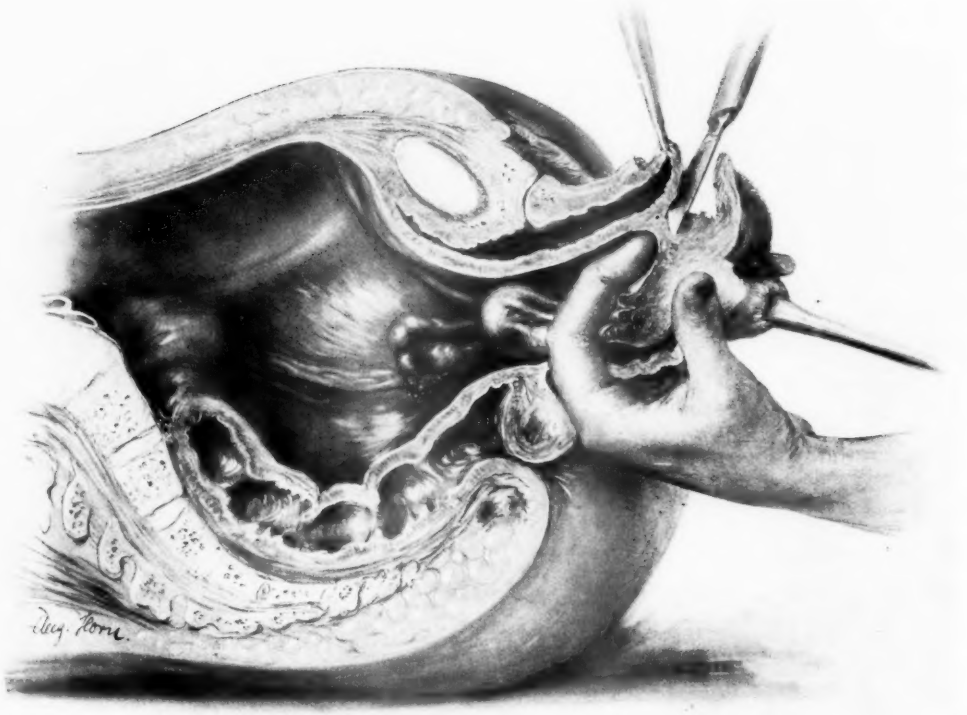


Fig. 2. *The finger as a guide in separating the bladder from the cervix.* The vaginal flap was dissected downwards from the bladder. Douglas' pouch was then opened up along the dotted line, and the left index finger carried down in front of the cervix tended to shove the bladder upward and away from injury while the knife dissected it from the cervix. In this case the tissue between the bladder and cervix was denser than usual.

can be passed through this opening, hooked over and carried down in front of the cervix between it and the bladder. The knife gradually cuts down upon this at a fixed point. By the employment of this method there is much less danger of injuring the bladder (Fig. 2).

After control of all the blood-vessels and removal of the uterus with or without the appendages, as is deemed advisable, the peritoneum of the pelvis is drawn down and attached to the vaginal mucosa. In this way the stumps of the vessels are completely covered over and nothing but a small opening persists between the pelvis and the vagina. When one removes a large area of vaginal mucosa, as in this case, and then joins the peritoneum to the vaginal mucosa, the remaining portion of the vagina is drawn up as it were into the pelvis, no slack being left (Fig. 3), and the bladder which has been prolapsed is again carried up into a relatively normal position.

It is comparatively easy to join the peritoneum of the posterior part of the pelvis to that of the anterior part. By means of several sutures introduced at different levels the peritoneal surfaces are approximated over a considerable area and the now shallow vagina is completely cut off from the pelvis. Care must be taken when suturing the peritoneum not to pierce any of the large vessels, otherwise troublesome oozing or a hæmatoma may follow.

We have removed the uterus in this way in several instances with great satisfaction. The method is applicable chiefly to those cases where marked prolapsus exists.

If the tissues are not brought up quite as snugly as one would wish, the perineum may be repaired.

Fig. 3. *Appearance of the lower part of the pelvis after the pelvic peritoneum has been united to the vaginal mucosa.* The pelvic peritoneum has been joined to the vaginal mucosa by means of interrupted catgut sutures and the stumps of the vessels have been covered over. The bladder has been drawn well up and the vagina is much shortened.

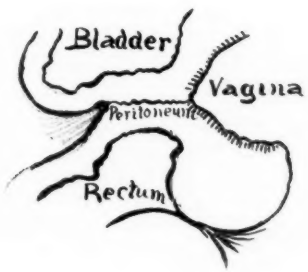


Fig. 4. *Closure of the pelvis.* The pelvic peritoneum is united over an area from 2 to 3 cm. long, care being taken not to pierce any vessels. If the vagina is lax, the perineum should be repaired.

I thought that this operation was original (if any vaginal hysterectomy can really be considered new) until my visit to Rochester a few years ago. There I saw Dr. Wm. J. Mayo do an operation somewhat similar in character, the only differences being that he did not take out so large a cuff of vaginal mucosa surrounding the cervix as we have done, and that Douglas' pouch was not at once opened up and a finger introduced as a guide. These, of course, are only minor differences.

IMPROVED TECHNIQUE FOR REMOVAL OF COLLAPSED VULVO-VAGINAL AND OTHER CYSTS AND HERNIAL SACS[1]

By ALBERT J. SCHOENBERG, M. D.
Surgeon to the Evangelical Deaconess Hospital; Instructor in Gynecology, College of Physicians and Surgeons, Chicago, Illinois

Experience teaches and authorities are agreed that the dissection and removal of collapsed cysts and adherent hernial sacs may be difficult.

In the case of cysts, it is important to remove the sac entire to effect a permanent cure. It is not difficult to follow the outlines of the sac in its ramifications when filled with its contents, but in many instances the cyst wall is so thinned that rupture takes place and contents escape, when it becomes most difficult to differentiate the cyst wall from surrounding tissues; this results in incomplete removal of the cyst wall and posssible injury to important surrounding structures.

In case of rupture, to again put the sac under the favorable conditions that existed before its rupture, the author has made use of gauze packing to distend and outline the sac, as illustrated by the report of the following case:

The patient, Mrs. F., presented herself for medical relief suffering with pain and swelling of the left labia. Upon examination, a large vulvo-vaginal cyst was found, which, according to her statement, had been operated upon thirteen years previously, and recurred some ten years later.

Operation. An incision was made through the skin surface of the labium down to the cyst wall. The dissection was slowly and carefully made, with especial

[1] Read before the Mississippi Valley Medical Association, October 14, 1909.

efforts to avoid rupturing the cyst, but in separating posteriorly it ruptured. A light artery forceps was clamped across the opening; this held for a short time but the sac soon ruptured again. The contents were then allowed to escape, and the cavity packed with strips of gauze; this outlined the cyst wall perfectly and greatly facilitated its removal.

This same method may be very advantageously made use of in the isolation and separation of hernial sacs when adherent or congenital, especially if the sac be thin and ill-defined, or when treated with irritant injections.

The following case gave an unusual opportunity for testing the advantage and feasibility of this method:

Mr. P., aged thirty-three, well nourished; family and personal history negative. At the age of twenty-four, after severe exertion, he first noticed the hernia. He was treated by irritant injections and was apparently cured for about six months, during which time he did all kinds of hard manual labor. At the end of this time the hernia reappeared, and since then has slowly increased in size.

Operation. An incision through skin and superficial structures was made, the external ring located, and the aponeurosis of the external oblique was slit in the direction of the inguinal canal just above the internal ring. The aponeurosis of the external oblique was dissected back and isolation of sac attempted, but the isolation and separation proved to be so difficult that after separating adhesions and removing scar tissue, and masses of tissue containing a putty-like substance varying in size from a filbert to a pecan, it was thought inadvisable to further bruise and tear the tissues. The neck of the sac was then exposed and opened, the contents returned into the abdominal cavity and the sac packed toward the distal end with strips of gauze until it was well filled. This outlined the walls perfectly, so the separation from the cord was greatly simplified.

This method has been used in subsequent cases and may be used for removal of cysts in any region,

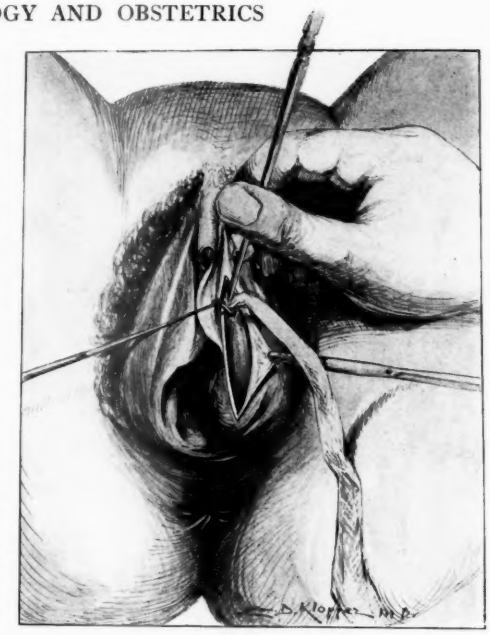


Fig. 1. Introducing the gauze.

as for instance broad ligament pancreatic cysts, and other cysts.

The advantages of this method are:

A complete removal with much less difficulty by the use of the packing, and the cyst can be removed intact, while bruising and tearing of tissue is minimized.

A NEW DEVICE FOR SUPPORTING THE ARM

By ARTHUR BARNETT EUSTACE, M. D.
From the Clinic of Professor John B. Murphy, Mercy Hospital, Chicago

Some fifteen years ago Dr. A. Radcliffe of Waukegan, Illinois, devised an appliance which he called "A New Axillary Splint," a description of the device appearing in the American Medico-Surgical Bulletin, September 1, 1894. The splint was originally intended to prevent cicatricial contraction following injuries about the axilla and to relieve the patient from confinement in bed.

The writer has made several modifications of this device, and also believes that it is an ideal apparatus which may be used in a great many surgical conditions other than that for which it was originally intended.

The splint consists of four parts, viz.: a belt with strap and buckle, three forks, a wire frame, and suspenders. The belt is made of a steel band three-quarters of an inch in width, which is padded, covered with leather, and a strap and buckle attached. The forks (see Figure 1) are three in number, each one being made in four parts. The fork itself (*a*) is made of forged steel, both extremities being bent backward and a thumb

screw inserted. The screw (*b*) forms the base, and the top of the loop the roof of an area (*c*) through which the wire frame for the arm passes. A steel rod (*d*) passes down from the base of the fork proper, the lower end of which is threaded and fits into a brass cylinder (*e*), which is likewise threaded, thus allowing one to regulate with ease the height of the forks as well as to adjust them perfectly to the arm. At the lower end of the brass cylinder a smaller fork (*f*) fits on to the belt and is fastened to it with a screw (*g*) below.

The wire frame is made of heavy copper wire bent at a right angle to conform with the arm when flexed at the elbow.

The suspenders are made of canvas and extend from the posterior portion of the belt over the shoulders and are fastened to the anterior portion by a strap and buckle. The device is easily adjusted in a few moments, so that it may be used for either the right or the left arm.

The application of the splint is a very easy matter. The belt is fastened around the waist at a level with the iliac crests and the suspenders then fixed in position and strapped so that they will support the weight of the arm when placed in the wire frame. The latter is then covered with a roller bandage which extends back and forth from the wire on one side to that on the other. This bandage is applied loosely, which allows it to form a trough in which the arm is placed, its position being as shown in Figure 2.

I believe the splint described above will form a perfect support for the arm and may be used in

Fig. 1.

Fig. 2.

all conditions where œdema or inflammation are evident. It might be well to note at this point a few of the surgical lesions for which we believe the splint to be adapted.

1. Fractures of the bones of the forearm.
2. Dislocations at the wrist and at the elbow joint.
3. Crushing injuries of the forearm.
4. Lacerated wounds of the forearm.
5. Burns involving the arm, the forearm, or the axilla.
6. Following the application of skin grafts to the arm, the forearm, or the axilla.
7. Following plastic operations upon the arm, forearm, or axilla.
8. Following operations for carcinoma of the breast, especially when a radical operation is made with axillary dissection.
9. Following operations on the arm, forearm, and axilla, such as (*a*) tendon suture; (*b*) nerve suture or operations upon the cervical or brachial plexus.
10. Following operations for osteomyelitis of the radius, ulna or humerus.
11. Infections of the hand and arm.
12. Injuries about the axilla, viz.: Lacerated and incised wounds and abscesses involving the axillary glands which have been incised and drainage instituted.

This splint will form a perfect support for the

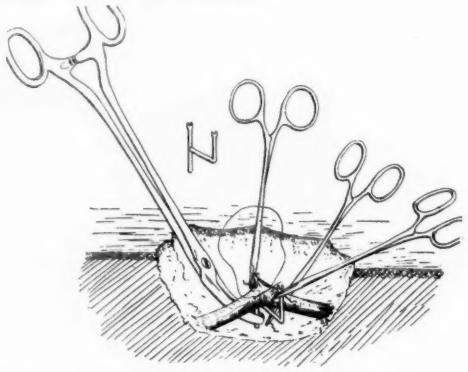
arm, hold the extremity in a fixed position and relieve all tension upon sutures. The device is not an expensive one and can be made by any village blacksmith. The patients who have worn them are emphatic in their statements that the splint is perfectly comfortable.

I wish to express my best thanks to Professor Murphy for his co-operation and kindness in allowing the author to use this splint upon patients in his clinic, and also to acknowledge my indebtedness to Miss Mildred Van Aken for the photographs reproduced above.

AN AID TO VESSEL SUTURING

By STERLING BUNNELL, M. D., San Francisco, California

This instrument is to hold the edges of the two vessel ends in position while the continuous suture is placed. No hands of an assistant are in the way holding guide sutures, and the edges to be sewed are held steadily and firmly and in perfect position. The instrument is held by a heavy clamp or needle-holder that rests on the field of operation. Two of the guide sutures, with mosquito hæmostats attached, hang over the notches while the third is pulled down by the weight of its hæmostat. The notches should be smooth and rounded to avoid cutting the delicate thread and for the same reason the points of the hæmostats should be covered with fine rubber tubing. They should hold the thread close to the notches. The instrument is especially useful when sewing vessels that are down deep in an incision. Here the clamp and hæmostats may, when banked up with towels,



slope steeply into the wound, and the sewing may be done with thumb forceps.

TRANSACTIONS OF SOCIETIES

WESTERN SURGICAL AND GYNECOLOGICAL ASSOCIATION

NINETEENTH ANNUAL MEETING, HELD AT OMAHA, NEBRASKA, DECEMBER 20 AND 21, 1909. THE PRESIDENT, DR. ARTHUR L. WRIGHT, CARROLL, IOWA, IN THE CHAIR

The association met at the Rome Hotel, and was called to order by the chairman of the local Committee of Arrangements, Dr. John P. Lord, who delivered a brief address of welcome.

GASTROINTESTINAL SURGERY

DR. THOMAS C. WITHERSPOON, of Butte, Montana, called attention to an occurrence which he believed threw some light on the question of paralytic conditions observed in the stomach and bowels, and reported the following case as an illustration.

A man, previously healthy, except for gastric symptoms, wiry and active, suffered from gastric ulcer of a chronic type. The ulcer was not situated in the pylorus, but to the left, and there was no obstruction to outflow from the stomach, nor was there dilatation. Eight days after a gastroenterostomy the stomach became acutely dilated until its lower curvature reached the pelvic cavity. A second operation, done because of the dilatation, nine days after the first, proved the duodenum was normal; the bowels were flat, the gastrojejunal opening still patulous, and there was no point of obstruction beyond the stomach which could be discovered. There was also no evidence of inflammation of the stomach or intestinal wall or peritoneum. A gastroenterostomy was performed and the fluid in the stomach had to be removed by pumping it out, as the stomach was completely paralyzed. The original incision in the epigastric area was not healed after eight days. It opened without instrumentation immediately upon snipping the stitches at the second operation. On the ninth day this man suffered considerable pain in the stomach area and behind to the left. Following the gastrostomy the pain ceased. The epigastric incision through which both operations were done was closed at the second operation by through and through silkworm gut stitches, and healed without the slightest inflammatory reaction.

The conclusions to which he came after observing this case were: "(1) The acute dilatation was the direct result of a paralysis of the stomach wall. (2) The lack of healing in the epigastric incision following a careful closure at the time of the first operation, and not associated with an evidence of infection, must be attributed to a trophic disturbance. (3) The stomach and epigastric abdominal wall are both innervated by the same spinal segment. It was a matter of logical deduction that the central apparatus was responsible for disturbance in both stomach and wound. (4) Some toxic agent only could have become so rapidly operative after eight full days of a normal condition following the operation, and this agent must have produced its effects by acting upon the ganglionic nerve cells in the spinal segment. (5) This toxic agent most probably took its origin from an abnormal fermentation within the bowel, or the liver failed to render harmless some produce absorbed from the bowel lumen."

He believed the majority of cases of gastromesenteric ileus took their origin from a like disturbance in the cord, and knowing how readily the gastro-enteric process might be disturbed by factors both local and remote, it became an easy matter to concede that a broken limb, an injury to the head, a severe nervous shock, as well as dietary indiscretion, and direct surgical attacks upon organs located in the abdominal cavity might be followed by stomach or intestinal paralysis.

In the last two and a half years he had had forty-six cases of general peritonitis following perforation of the appendix and of stomach ulcer get well. In these cases a continuous proctoclysis was not practiced save in two of them. The method of administering the water was that of intermittent injections into the rectum, averaging about sixty to eighty ounces in twenty-four hours. Where the patient's condition allowed removal of the appendix or closure of the ulcer and the establishment of pelvic drainage, they recovered. During this period he had had five deaths where simple drain of the pelvis was all that was done, due to the extreme condition in which the patient was brought to him. They all agreed as to the value of introducing water per rectum and keeping

the stomach empty, but he thought too much stress had been laid upon the value of continuous proctoclysis, using physiologic salt solution. The Fowler position with pelvic drain seemed to be the life-saving factor in general peritonitis.

DISCUSSION

Dr. Leonard Freeman, of Denver, Colorado, stated that Dr. Witherspoon had called attention to dilatation of the stomach which took place without apparently mechanical cause, and he attributed to some of these cases the action of bacteria upon the nervous system. That might be true, but he somewhat doubted the absence of mechanical cause in addition to the action of the bacteria on the nervous system. They knew that there were certain individuals who had stomachs which were difficult to empty, and that difficulty in emptying the stomach was due perhaps to a sagging of the intestines, large and small, particularly the large intestine, in pulling down upon the stomach and to a certain extent influencing the pylorus. Such cases occurred once in a while and accounted for many difficulties in the emptying of the stomach. He thought if they were to trace these cases of dilatation of the stomach, they would probably find in the stomach of those people who had had such dilatations some difficulty in the emptying of the stomach originally. Some time ago he operated on a very simple pelvic case which was followed by dilatation of the stomach clear down to the pelvis, and which resulted in the death of the patient. The autopsy showed that there was no absolute obstruction to the pylorus. There was no obstruction of the intestines themselves, and yet a fresh adhesion took place at the site of the pelvic operation to the omentum, which pulled upon the large intestine, and that in turn pulled upon the gastrocolic omentum to such an extent as to shut off the pylorus. This was demonstrated at the autopsy and accounted for the fact that the stomach had dilated to a certain extent. He thought a combination of these things, namely, a stomach which did not empty itself very readily, combined with a toxæmia and possibly with some pelvic affection, would serve to explain these cases better than to adopt the theory that the trouble was entirely nervous.

Dr. Clifford U. Collins, of Peoria, Illinois, stated that he was interested in the reference which was made to the separation of the abdominal incision. Madelung some years ago reported a number of cases in which separation of the abdominal incision had occurred, and came to the conclusion that the kind of suture material used for closure of the wound had nothing to do with the separation. Dr. Emil Ries a few months ago reported three cases in which separation of the incision had occurred. The separation began at the peritoneal layer, and there was a gradual separation until the skin was reached, the skin being the last process in the separation. He would like to ask Dr. Witherspoon whether in the first case he mentioned the peritoneal and muscular layers showed any granulating process to indicate that separation had occurred some days before. The second case was rather unique in the fact that separation occurred first in the skin and then the muscle layer. In most of the cases reported the separation had occurred in the peritoneal and muscular layers.

Dr. Chas. H. Mayo, of Rochester, Minnesota, stated that as to acute dilatation of the stomach, he understood Dr. Witherspoon to recommend gastrostomy for the treatment of this condition. In the cases reported the stomach was greatly distended and flaccid and so paralyzed that it would not empty through the incision made into it, and the contents had to be pumped out. A great many more cases of dilatation of the stomach occurred than was generally believed, and he would recommend the more frequent use of the stomach tube. In most cases the stomach tube was applied in the post-operative treatment of his surgical cases when vomiting occurred or sick stomach existed. When these patients were not doing well it would be found many times that there was so much paralysis that there was no effort on the part of the stomach to empty itself, and yet it would be found to contain half a pailful of fluid, the pressure of which on the abdominal wall had a great deal to do in producing anæmia of the area of the blood supply which promoted healing, so that if they had an internal pressure beneath the suture line, limiting the capacity of the abdomen, they would have slow healing, and when they wanted to reoperate, if they cut the sutures, the wound readily opened, and it quickly healed after distention was relieved. Oftentimes the distention could be relieved by resorting to the stomach tube without a secondary operation, and he thought a little more stress should be laid on that point.

Dr. I. B. Perkins, of Denver, Colorado, stated that they all knew that it was usual to have considerable nausea following anæsthesia, and for several years he had made it a practice to put the patient in the high Fowler position, and he found in that position patients had much less nausea, they could take water freely, and it passed readily into the intestines, and he found there was much less dilatation of the stomach in these cases than

he formerly had. He had had occasion to experiment a little on himself in this line. He took an anæsthetic to determine whether or not it was the psychic effect of position, or whether it was due to his theory of drainage. At any rate, he had had no nausea after he was put in the Fowler position.

DR. CHAS. H. WALLACE, of St. Joseph, Missouri, stated that he thought they all agreed that the failure of union of abdominal incisions, or incisions anywhere, was due to sepsis, no matter whether the sepsis be pre-operative or post-operative. There was another condition which he had encountered two or three times in the failure of union of the abdominal wall, which he thought was a factor in these cases, and that was the condition of the blood of the patient before operation. He recalled two cases in which there was pronounced anæmia, although operation was imperative, and there was failure of union in other constitutional dyscrasiæ, such as chronic nephritis, and where they were compelled to operate on such patients the wounds might fail to unite on account of the constitutional condition present.

ABDOMINAL CONTUSIONS WITH SPECIAL REFERENCE TO INDICATIONS FOR EARLY OPERATION

DR. L. W. LITTIG, of Iowa City, Iowa, reported four cases of contusions of the abdomen with a view to giving the indications for early operation. The author quoted Hertle, who said that fifty-two per cent of the patients recovered when operated within the first six hours, forty-six per cent when operated during the second six hours, twenty-one per cent when operated during the second twelve hours, and but seven per cent when operated during the second twenty-four hours. A history of the accident, the shape of the vulnerating body, and the direction of the blow were of considerable value. Blows directed toward the spinal column were more apt to result in rupture of the intestine than blows which were slanting and which were directed away from the spinal column.

After discussing the symptoms and diagnosis of abdominal contusions, the author said that if there was a contusion of the abdomen, and if the muscles were rigid, one should operate. Patients might be seemingly well for a number of hours or even days, and that injury to the mesentery might result in gangrene of the intestine and death. Given a case of abdominal contusion, followed by board-like rigidity of the abdominal muscles, which did not quickly disappear, a laparotomy should be immediately performed. This symptom might be absent during shock in the absence of pain, but its absence under these conditions must not be regarded as a favorable symptom. There might be some cases in which necessity for immediate operation was not clear. In such cases do not give opium. There would be other cases which did not seem severe, and in which an operation did not seem to be indicated. In these cases do not give opium.

DISCUSSION

DR. CHAS. W. OVIATT, Oshkosh, Wisconsin, stated that a case recently came under his observation of a man who was struck in the right iliac region with a board from a circular saw. Rigidity was marked from the start, but other symptoms did not develop for forty-eight hours. The patient refused operation, and died. Autopsy revealed that the cæcum was torn loose from its attachment, with a hole in the bowel. No symptoms which would seem to call for immediate operation presented themselves for at least thirty-six hours, and yet this case emphasized the importance of operating early when rigidity was marked.

FOREIGN BODY IN THE INTESTINE

DR. CHAS. W. OVIATT, of Oshkosh, Wisconsin, reported the following interesting and unique case: A Swede, male, aged 53, was admitted to St. Mary's Hospital, February 22, 1908. It was impossible to obtain anything like a clear history of the patient's previous condition, and no account was given of the swallowing of the foreign body. He complained of pain low down in the right side, and upon physical examination a circumscribed area of resistance could easily be made out with pain on pressure at this point. The pulse and temperature were normal. The diagnosis of appendicitis was perhaps too quickly made, but the author's inability to get a clear history of the case was his excuse. Upon opening the abdomen through the outer border of the right rectus, a pointed foreign substance could be easily felt in the cæcum. Through a very short incision into this viscus, a lead pencil, which he showed, seven and a half inches in length, was removed. The appendix was small, presented no evidence of disease and was not removed. On the day following the operation, the patient was shown the pencil and asked if he could account for its presence inside of him. He then remembered that about ten weeks before, while engaged in a game of cards in a saloon, acting in the capacity of scorekeeper, he had the pencil in his mouth and during a fit of laughter swallowed it. He stated that for a day or two following the accident he had some pain in the stomach, but after that had experienced no trouble, and had forgotten the incident entirely.

SECONDARY (POSTERIOR) GASTROJEJUNOSTOMY FOLLOWING RECURRENT ULCER AT THE SITE OF ANTERIOR GASTROJEJUNOSTOMY PERFORMED EIGHT YEARS PREVIOUSLY, TOGETHER WITH STATEMENT AS TO CAUSE OF GASTRIC ULCER

Dr. J. F. Percy, of Galesburg, Illinois, described a case of reoperation for perforation of a gastrojejunal ulcer following an anterior gastroenterostomy performed eight years previously. The ulcer was on the left side of the union between jejunum and stomach. It involved not only the scar tissue of the anastomosis, but also adjacent portions of the stomach and jejunum. The perforation had been sealed by the omentum. He described three things belonging to the intraabdominal picture: *First*, an enormous thickening of the efferent and afferent loops of the attached jejunum; *second*, a perforated gastrojejunal ulcer at the point of the previous anastomosis; *third*, complete burial of the pylorus and adjacent liver region in a mass of dense adhesions. The most striking and insistent thing was the hypertrophy of the jejunum. Its walls were fully two and a half inches in diameter. The operation consisted in removing the jejunum from the stomach wall and closing up the openings, including the ulcer. A posterior gastrojejunostomy was then performed with the short loop. He claimed that this was the first reported case in which this procedure had been followed. He discussed the causes of gastric, duodenal, and jejunal ulcers. He did not believe that hyperacidity accounted for all phases of the causes of these ulcers. He gave the chief role to chronic cholecystitis and referred to a paper read before the Society in 1904 (Journal American Medical Association, July 8, 1905) in which he showed that chronic cholecystitis was not only the cause of ulcers of the stomach and duodenum, but that it was the cause of cirrhosis of the liver in those with no history of alcoholism, as well as of chronic pancreatitis.

DISCUSSION

Dr. L. L. McArthur, of Chicago, stated that he was inclined to agree with Dr. Percy as to the influence which an abnormal flow of bile might have in the maintenance of hyperacidity. The bile was naturally the antidote of the acid secretions, and irritation about the gall-bladder would not infrequently influence the condition of the stomach secretions. The theory advanced by Dr. Percy might be further elucidated by laboratory experiments, and he would like to suggest that he have them carried out.

Dr. Chas. H. Mayo, Rochester, Minnesota, stated that this paper brought to his mind one thing, and that was, ten years ago, when there were comparatively few gastro-enterostomies done, surgeons heard more about ulcers of the jejunum in proportion than they did to-day. Out of a good many gastro-enterostomies they found that condition very rare in their own experience. Their experience, however, corresponded to what Dr. Percy had reported, namely, after anterior gastroenterostomy the ulcer has been at the site of the gastro-enterostomy instead of being lower down in the bowel.

Dr. Percy, in closing, stated that he had just completed some laboratory work by which he would try to prove some of the things that were merely visionary now.

DIFFUSE SEPTIC PERITONITIS

Dr. Byron B. Davis, of Omaha, Nebraska, stated that the decrease in mortality of acute spreading infection of the peritoneum was due to the recognition of three important factors. *First*, the chief absorption from the peritoneum was carried on by the diaphragm, seconded by the great omentum. *Second*, the Fowler position with free tubular drainage from Douglas' cul-de-sac had proven efficient in turning the current in the opposite direction, thus removing the toxins harmlessly. The *third* important contribution was made by Dr. Murphy in the use of normal salt solution by his efficient method. There were other factors of only less importance, all of which must be recognized in order to get the best results. As the transition from the older methods to those of the present was slower with some of them than with others, he could only include in his series of cases those operated upon since January, 1907. After the exclusion of cases which could not rightly come in the category of the cases under discussion, his records showed that since January, 1907, he had operated on thirty-nine cases of diffuse septic peritonitis, with three deaths. Thirty-five were due to appendicitis, with one death; two were caused by the perforation of a typhoid ulcer, with one death; one was a case due to puerperal sepsis, with an immense amount of free pus in the peritoneal cavity. This woman recovered. And there was one case of perforating duodenal ulcer which ended fatally. Twenty-eight were males, and eleven were females. The average age of all the cases was 26 years and 10 months. The youngest patient was a little boy, aged five years, and the oldest was a woman, aged 48 years, the only fatal case due to appendicitis. The appendix was removed at the primary operation in thirty-two cases. In the remaining three the condition was so serious that it was not thought prudent to do more than simple drainage, and the appendix was

left. Two of them had had their appendixes removed by a subsequent operation. The third one recovered and was still carrying his appendix, but intended entering the hospital to have it removed this winter. In four cases, fæcal fistulæ persisted, which were cured by subsequent operation. There had been two cases of ventral hernia operated on, and he knew of two others with hernia which would be operated on, if troublesome. There were probably others, as he believed ventral hernia was frequent after such prolonged drainage. There had been no case of intestinal obstruction following these operations. The period of convalescence had in a few cases extended over a number of weeks and in two of them four and five months respectively. In the greater number the convalescence had been comparatively brief, not longer than he expected after opening an appendiceal abscess.

Detailed reports of the three fatal cases were given.

A SCIENTIFIC INQUIRY INTO THE PRESENT TREATMENT OF PERITONITIS

Dr. Arthur E. Hertzler, of Kansas City, Missouri, reviewed the present treatment of diffuse peritonitis, taking up the various factors which went to make up this treatment, and examined them in the light of established facts in abdominal physiology and pathology. He concluded that the explanation of their mode of action had but limited scientific basis. Most of the papers lauding the effectiveness of the modern treatment were unaccompanied by case reports, but those which were so elucidated showed that the favorable prognosis was dependent largely on the fact that cases were included in the statistics which were in no sense diffuse. The present improved prognosis was dependent on earlier diagnosis of the disease, and a more accurate determination of the exact anatomic relation of the disease, making it possible to accomplish the necessary operative work with the least possible traumatism and loss of time. The Fowler position and the introduction of fluids into the body either by vein or rectum had but a minor influence in the determination of a favorable outcome.

In order to facilitate the grouping of cases of peritonitis, he proposed the following classification: 1. The perforative. This group included those cases in which there was expelled into the peritoneal cavity some of the contents of the hollow viscera without there having been any previous protective reaction on the part of the peritoneum. 2. The progressive, in which there was escape of visceral contents into the peritoneal cavity unprotected by adhesions, but in which the peritoneum had undergone a protective reaction. 3. Imperfectly encapsulated. This type joined the preceding without a sharp line. There were adhesions present in some areas, but there was extension in some direction, e. g., along the cæcum or into the pelvis in appendicitis. 4. The peritoneal abscess, in which there was perfect encapsulation of the infected area.

He asserted that peritonitis was diffuse in the beginning in all cases and the determination of the group to which they would ultimately belong depended on the relation of the factors or virulence of infection and the powers of resistance. The earlier operations were done, therefore, the greater the number of cases which would be operated upon before they had had time to become encapsulated.

DISCUSSION

Dr. R. C. Coffey, of Portland, Oregon, stated that in acute perforative conditions the point of drainage would depend largely upon where the perforation had taken place. In a perforation of the gall-bladder or duodenum the drainage was usually near the median line, or where a patient had been transported a distance and rolled from side to side, it was essential to use the Fowler position, because in putting patients straight up one got the fluids to gravitate to the bottom. Another important feature he wished to call attention to was drainage at the point of suture of the opening. If one sutured a perforated intestine and that intestine was allowed to come in contact with drainage, a fæcal fistula would likely result; therefore, it was important to make drainage remote from the point of suture. It was also important that the intestines be lifted away from the drain and not insert the drain irrespective of its relation to the intestines.

Dr. Van Buren Knott, of Sioux City, Iowa, stated that he agreed with Dr. Coffey that the Fowler position had had more to do with their recent success in the treatment of diffuse septic peritonitis than any other method of treatment of diffuse septic peritonitis which had been employed, although this was somewhat in opposition to the opinion of Dr. Hertzler, who maintained that early diagnosis and prompt treatment should receive the credit. In 1902 he was deeply impressed by Fowler's paper and the position advocated by him in cases of acute peritonitis. Up to this time most of his cases of diffuse septic peritonitis died, but as soon as he began to employ the Fowler position they commenced to get well. Shortly after this he read a paper before the association advocating a stab wound in the median line of the lower portion of the abdomen and drainage

through the retrovesical pouch and drainage through the vagina in cases of diffuse septic peritonitis. Since that time he had invariably employed this method with gratifying results.

DR. DANIEL N. EISENDRATH, of Chicago, stated that there were points in the pathology and etiology of peritonitis which neither Dr. Davis nor Dr. Hertzler had referred to, and as a few of these cases had come under his observation during the past three or four years he thought it might be well to speak of them here. These were the cases in which he had a genuine peritonitis, so far as the pathology was concerned, without visible perforation of the appendix or any other viscus. They were not the cases in which a perforation of the duodenum or stomach had been overlooked, but cases in which streptococci migrated along the lymph channels through the appendix wall and got into the general peritoneal cavity in that way. These cases had occurred not only in his own practice, but in that of others. In looking up a series of cases which they had had at the Michael Reese Hospital in the past ten years, he found there were two of his own, and five others in the practice of Drs. McArthur, Andrews, and Greensfelder. In addition to these, there had been quite a number of cases reported in the literature. They overlooked in little girls a general peritonitis from infective salpingitis. Reidel had recently called attention to this, and had held autopsies on nine little girls who had died of general peritonitis in spite of operation. He found no perforation of the appendix, but simply a very marked and intense salpingitis.

DR. CHARLES H. WALLACE, of St. Joseph, Missouri, stated he noticed that in these cases of perforation of the appendix or perforation of any hollow viscus, if he operated within the first twenty-four or forty-eight hours, the question of drainage was a minor one if he removed the pathology and closed the opening. They knew there was a class of cases that became so septic that they got no drainage, it mattered not what they put in for the purpose of drainage. The wound looked like a wound in a cadaver; there was no exudation of serum, and in this class drainage failed to accomplish anything because the patients were beyond all hope. But in the cases of chronic abscess drainage was of great value.

FURTHER OBSERVATIONS ON ENTEROSTOMY AND ITS TECHNIQUE

DR. JOHN PRENTISS LORD, of Omaha, Nebraska, in his paper reported four fatal cases in addition to the four successive successful cases mentioned last year. In one the enterostomy was done for typhoid perforation peritonitis, death being due to the extension of the peritonitis. Numbers two and three were operated on for appendicitis and peritonitis, death resulting from ileus due to peritonitis. Number four was due to septic ileus. The drainage was practically *nil*, and the condition persisted. Enterostomy was recommended above the line of suture as a vent in resections of the distal half of the large bowel in order to prevent distention from gas, which was responsible for the greater number of failures in the suture of this portion of the large intestine. The simple technique by three pursestring sutures about a large catheter was an easy, quick, and ready means of draining the bowel of gas and fæces. It was life-saving, and might save some otherwise hopeless cases of obstruction due to peritonitis. The fatal cases reported were extreme ones, and the operation was done as the only remaining recourse.

SOME OBSERVATIONS CONCERNING INTESTINAL SUTURING

DR. ARTHUR E. BENJAMIN, of Minneapolis, Minnesota, read a paper on this subject which will appear in a later issue of this journal.

THE PAST, PRESENT, AND FUTURE OF THE WESTERN SURGICAL AND GYNECOLOGICAL ASSOCIATION

PRESIDENT WRIGHT referred feelingly to the death of a former president and co-laborer, Dr. H. D. Niles, of Salt Lake City, and expressed the hope that suitable action would be taken by the members in regard to the loss the association had sustained.

The conception of surgeons in the West uniting and forming an association for the sole purpose of discussing questions of interest to them only, originated with Dr. Milo B. Ward, a specialist doing abdominal surgery in Topeka, Kansas. He quoted Dr. Ward as having said that "to accomplish the purpose of its creation, it was necessary that its membership should be limited; that it should be representative in character, and though its conditions of admission be exacting, they should not be used for a selfish motive. The intention was not to exclude meritorious candidates, but to prove their qualifications, and place a high value on the accumulative results of those associated and working together along scientific lines for a definite purpose, the increase of surgical knowledge and technique, the alleviation of suffering, and prolongation of human life."

The initiative of the association was primarily the betterment of the members surgically, and demanding from the public the respect and confidence their skill merited. This confidence in the

ability of each other had done much to make it possible for the surgeon in the small town to relieve serious emergencies with minimum suffering and loss of life. Formerly the idea prevailed that special skill existed in the densely populated centers only. The tradition was rapidly passing away and the halo of the city *confrere* found no longer than the one at home. Each and every man was better for having been a member of this association. His influence had aided materially in removing the evidence of weakness and in placing the organization on so firm a basis. If this standard be maintained, they must not lose sight of the fact that the honest and conscientious surgeon was not born, but gained his knowledge, skill, and dexterity by persistent, painstaking labor and constant application to a science more sacred than life itself. The qualifications of surgeons differed in many respects, depending on education, environment, personal experience and individuality.

He could not refrain from mentioning the depredating influence of the young specializing in surgery before their mental faculties had fully expanded. This injured the mind and warped the intellect of the student by depriving him of adequate medical and literary training, so essential to the thoroughly equipped surgeon.

In order that its present position be maintained, the credentials of each applicant for membershp should be carefully examined and only those admitted who were known to be proficient in the science and art of surgery through long service, wide experience, and close application to the principles underlying an almost exact science. An effort should be made each year to infuse new blood. This would add vigor, strength, and a new working element that would maintain the association in its present position.

RECENT PROGRESS IN SURGERY OF RENAL CALCULI

By Dr. Daniel N. Eisendrath, of Chicago. This paper will appear in a subsequent issue of Surgery, Gynecology and Obstetrics.

DISCUSSION

Dr. M. L. Harris, of Chicago, stated that the need of knowing the condition of both kidneys was very important. The frequency of bilateral kidney stones was a fact which was little recognized by most physicians, and only by very few surgeons, unfortunately, because the frequency with which some accident happened to the patient after the removal of the first kidney was very great. It was impossible to determine the existence of bilateral kidney stone by the symptoms, as frequently the symptoms were limited to one side for at least a long time, and by depending entirely on the symptoms one was led to operate on that side and neglect to examine the opposite side. This was forcibly illustrated to him the past week. A patient came to him with a history of renal stone, with repeated attacks of renal colic in the left side, and he sent him to the hospital for the purpose of examining the two kidneys by catheterization. They set an appointment two days ahead. On the morning on which he was expected to make the examination, the patient got to the hospital before he did, and was seized with an attack of acute renal colic on the right side. Up to that time he had no symptoms whatever of involvement of the right kidney, yet on the eve practically of doing something for left-sided trouble, he suddenly manifested evidences of involvement of the opposite kidney. After he had passed over his colic, he catheterized both sides and found both kidneys involved. This case showed that they should invariably examine both kidneys, not only by X-ray, but by separating the urine from each kidney in every case of kidney trouble on which they expected to operate. That was the most important lesson they were to draw from this excellent paper.

Dr. Leonard Freeman, of Denver, Colorado, stated that he should like to speak on one embarrassing complication in operating on kidneys for stone, and that was secondary hæmorrhage. It was an extremely unfortunate thing to have operated upon a kidney and successfully removed a stone and have the patient go on in the best of condition for a week or ten days and then begin to have a little blood in the urine, a little more the next day, and still more the next. Such hæmorrhages were not infrequently fatal. The only thing they could do under these circumstances was to remove the kidney, and the sooner that was done in the presence of secondary hæmorrhage the better it was for the patient. That, again, illustrated what Dr. Harris had said, namely, it was absolutely necessary to know, before they extract a stone from one kidney, whether the patient had another kidney or not, and whether that kidney was doing its duty, because in the face of a severe secondary hæmorrhage of this kind it was impossible sometimes to find out the condition of the second kidney. He had had this happen to him twice. Once on the seventh day a hæmorrhage began as a slight hæmorrhage, and the following day a severe one, which almost killed the patient; and in the second case the hæmorrhage began on the ninth or tenth day and a very severe hæmorrhage did not manifest itself until the twelfth or thirteenth day. In each case he did nephrectomy

under desperate circumstances, using salt solution and adrenalin in the vein to resuscitate the patient, and had the satisfaction of seeing these two patients recover. But it was a very close call in each case.

Dr. Arthur C. Stokes, of Omaha, Nebraska, said he had a specimen he should like to show of a stone in the kidney, in which case the symptoms were almost none. Preceding the operation for removal of the kidney the patient was operated on, a diagnosis having been made of floating kidney. An incision was made, going straight through the muscles of the back, and in the attempt to tie the kidney up to the back, a lot of pus was found. The surgeon was not prepared to remove the kidney. The patient subsequently came under his care and the kidney was removed. This patient had practically no symptoms, yet the kidney was almost entirely destroyed. The parenchyma was almost entirely gone, leaving only fibrous tissue here and there. The stone remained in the kidney as it was. On the removal of the kidney, about a quart of pus came out of its pelvis and around the kidney. The kidney pelvis was practically destroyed. He wished to emphasize the great care that should be taken in the diagnosis of renal stone. There was no symptom nor set of symptoms pathognomonic of kidney stone. It had happened to him several times to have made an absolute diagnosis of stone in the kidney, and yet on opening no stone was to be found. This was embarrassing. Now that they had the use of the X-ray in kidney stone work, they were able to differentiate a stone in the kidney from pyonephrosis, pyelonephrosis, and so forth.

Dr. Chas. H. Mayo, of Rochester, Minnesota, stated that there was no major operation which was undertaken with less working out of details than operative procedures on the kidney. Many times they would see very good surgeons undertake an operation of the kidney just because there was a tumor, when it would only take a little more time to determine the functional capacity of both kidneys and see if any emergency existed, like Dr. Freeman reported, for a stone operation. When one became advanced in kidney stone work he felt that he must determine the functional capacity of each kidney, and feeling, above all things, that in some instances he must preserve the kidney after removing the stone.

Anomalous blood-vessels were encountered in kidney work. These were not uncommon, although it was only lately they had been getting on to the fact that they were present.

Dr. A. W. Abbott, of Minneapolis, Minnesota, stated that with regard to the anatomy of the kidney he wished to say that Dr. McArthur of Chicago had reported a case in which the blood supply was from the external iliac; while in a case of his own the supply was from the internal iliac. They were both congenitally placed kidneys.

MOVABLE LIVER AND CONSTRICTION LOBE OF THE LIVER

Dr. M. L. Harris, of Chicago, said that movable liver was found in two classes of patients, namely: Those in whom the movable liver was the chief or only abnormal condition present, and those in whom it was but a part of a general visceral ptosis. In the former class the condition was probably due to congenital defects of the attachment of the liver, while in the latter class the loss of the support affected by a firm abdominal wall, together with a gradual yielding and elongation of the attachments of practically all the abdominal organs, played an important part in the condition.

Constriction lobe was a very common condition, being found according to Leue in 1.9 per cent of the male, and 25.3 per cent of the female subjects over sixteen years of age, posted by him, 3,484 in number.

Both movable liver and constriction-lobe might give rise to symptoms which were quite distinct and often very distressing, relieved only by properly suturing the liver in place, or by suturing the floating lobe to prevent its abnormal mobility.

DISCUSSION

Dr. R. C. Coffey, of Portland, Oregon, made it a point to fix a movable kidney where it could always be felt with the hands afterwards; and the women did not have pain and redisplacement, and the results were good. As regarded the liver, in twenty-two cases of gastroptosis, he found the liver displaced in four cases sufficiently to require suture; but his technique had been a little different from that of Dr. Harris, in that he did not believe it was necessary to scarify the liver. In the cases he had had there had been no displacement.

Dr. James E. Moore, of Minneapolis, mentioned the case of a woman, a neurasthenic, who was confined to bed most of the time, complaining of a tumor in the lower abdomen. He found the right end of the liver was loose, so that when she turned on the liver side the edge of the liver ran up and down, the organ being pushed over to the middle of the abdomen. Shortly after suturing the liver in place the woman got out of bed and had been traveling all over the United States and other countries ever since.

Dr. A. F. Jonas, of Omaha, said that at a meeting in Chicago he reported three or four cases of ptosis of the liver where the margin of the liver descended four fingers' breadth below the right

costal margin. At that time he had used the gall-bladder as a suspensory ligament. The patient was placed in the semi-Trendelenburg position, and the liver pushed up as far as it would go, and sewed with the gall-bladder to the upper margin of the incision, which was extended up against the costal arch. This operation was successful. He had occasionally done that operation since, but in no case except in those where the liver could be pushed in its normal position.

TWO CASES OF OPERATIVE REMOVAL OF CERVICAL RIBS

DR. S. C. PLUMMER, of Chicago, said the first patient was a woman, twenty-four years old. Symptoms began eight years previously and consisted, at first, of pain extending from the axilla to the middle of the ulnar side of the forearm. Four years ago weakness of the hand and later some muscular atrophy appeared. Pain was aggravated by slight exertion. No anæsthesia.

The second patient was a woman, thirty years old, whose symptoms began twenty years ago. Pain in this case was confined to the ulnar side of the forearm. As in the first case, it was aggravated by exertion, but was also brought on by exposure to cold. She also suffered from coldness of the extremity. There was atrophy of the thenar and interossei muscles. No anæsthesia.

Both of these cases had bilateral cervical ribs, as shown by the skiagram, but in both the symptoms were confined to the right upper extremity. The first patient was operated upon March 16, 1905, and her case was included as case 37 in Keen's article, published in the *American Journal of the Medical Sciences*, February, 1907.

The second case was operated upon September 22, 1909. In each case an incision extending obliquely upward and backward for about three inches from just above the right clavicle at the outer border of the sterno-cleido-mastoid muscle, was employed. The first patient reported December 14, 1909, that she now had very little pain, but that the strength of her hand had not improved. The second patient was almost entirely free from pain one month after the operation, but was still somewhat sensitive to cold.

DISCUSSION

DR. JAMES F. PERCY, of Galesburg, Illinois, said four years ago he saw three cases of cervical rib in one year, one of them in a girl, fourteen years of age. The second was a girl, sixteen years of age, and in this case the cervical rib was also on the left side, as in the first case. It was discovered by the dressmaker, and the patient came to him because of swelling. The third case was in a girl, 20 years of age, who had the condition on both sides. Not one of these patients had been operated on up to date.

DR. L. L. MCARTHUR, of Chicago, had seen a case of double cervical rib which produced atrophy of the muscles of the hand and double drop-wrist, but unattended by pain. Operation was refused.

DR. A. F. JONAS, of Omaha, reported a case of cervical rib in a young woman, 21 years of age. She had a swelling in the left side of the neck, which was tender and hard and had been diagnosed as sarcoma of the cervical vertebra. The rib could be seen pressing underneath the skin. He cut down upon it and found running over it what he thought was the common carotid artery, but it proved to be the subclavian artery. He reported this case to call attention to the anomalous course of the subclavian artery on the left side, in this particular case.

DR. HARRY M. SHERMAN, of San Francisco, reported the case of a woman, 30 years of age, who complained of pain in the arm. Cervical rib was suspected on account of the character of the pain. The rib could be felt, and a skiagraph showed its presence. It was removed, and the pain and disability symptoms disappeared. Later, during pregnancy, the pain had recurred. He was anxious to see whether this pain would disappear after confinement.

HERNIA: WHAT CONSTITUTES A PREDISPOSITION?

DR. A. F. JONAS, of Omaha, Nebraska, in his paper drew the following conclusions: 1. All deductions as to predisposition to hernia that were based on the direction and size of the inguinal canal, a large external ring, were untrustworthy. 2. All opinions as to predisposition based on the vague ideas of muscular weakness, reduced abdominal resistance, and diminished support of connective tissue structures, were unreliable. 3. Retarded descent or undescended testicle favored, a complete or partial non-obliterated vaginal process might be regarded as an anatomical predisposition to oblique inguinal hernia. 5. The non-closure of the vaginal process could not be recognized clinically. 6. It would seem that we were scarcely justified in using the term *predisposition to hernia*, because of the lack of reliable clinical data.

THE FREQUENCY OF CONGENITAL SACS IN OBLIQUE INGUINAL HERNIA

This paper by DR. WILLIAM HESSERT, of Chicago, appears in this issue. (See p. 252.)

SOME ANOMALIES OF THE SIGMOID

DR. L. L. MCARTHUR, of Chicago, presented the histories of two cases illustrating anomalies of the sigmoid. He was in accord with Dr. Clark in not favoring the fixation by suture of such loops to either the anterior or posterior wall, as the potential dangers were almost equally as great as that of recurrence. Were a similar case to be met with, he would make a side to side anastomosis, between the proximal and distal end before restoring it to the abdomen, just as he had corrected a rectal prolapse by anastomosing the drawn-up rectum to the first portion of the sigmoid.

PREPARATION OF PATIENTS FOR PROSTATECTOMY

DR. E. S. JUDD, of Rochester, Minnesota, said the general tendency regarding the preparation of patients for surgical interference was to reduce the details to a minimum, although there were some classes of cases that would do better if they were especially prepared. In reviewing the autopsy findings in cases from the clinic in St. Mary's Hospital which had terminated fatally following operation for the removal of the prostate, he found that the cause of death in practically every instance was kidney insufficiency, and acute nephritis superimposing upon an old kidney lesion, usually chronic nephritis. Because of systemic conditions some of these cases were not good subjects for operation; on the other hand, the poorest subject would sometimes endure a difficult prostatectomy with considerable loss of blood and be in good condition in a few days. As the gland increased in size the amount of residual urine increased until the back pressure, coming gradually, became a constant factor in the function of the kidney. Continued withdrawal of the pressure would throw the kidneys into a condition of acute congestion, and if they were partially disabled the sudden change might prove very serious, resulting in acute nephritis and suppression. To overcome this difficulty he commenced by emptying the bladder with a catheter at stated intervals, gradually shortening the intervals until the bladder was emptied every hour. In his experience it had not been satisfactory to leave catheter in the bladder. No particular advantage was to be derived from special diets, therefore, regular diet was maintained up to the morning of the operation. One ounce of castor oil given forty-eight hours before operation was most satisfactory. Salt solution per rectum soon after operation was an aid in elimination of the kidneys. Looseness of the bowels was most undesirable. The arteries of these patients were hard and inelastic and it was difficult to fill up the circulation. The patients were, therefore, encouraged to take great quantities of fluids for several days before operation. Urotropin given in seven to ten grain doses several times each day for a few days before operation would help the condition and tend to better the quality of the urine. The cystoscope was a valuable aid in the determination of the amount and kind of preparatory treatment. An operation should not be attempted during an acute cystitis or epididymitis. He did not believe it advisable to remove the gland in the stage of acute retention.

LYMPHANGIOMA WITH REPORT OF A CASE OF MACROGLOSSIA AND A CASE OF MACROCHEILIA

DR. A. A. KERR, of Salt Lake City, Utah, stated that where practical, the proper treatment of lymphangioma was excision. In macroglossia, if the swelling interfered with mastication, speech, and deglutition, the proper treatment was partial excision. In macrocheilia, partial or complete extirpation was indicated for cosmetic purposes, as well as a prophylactic measure against infection, or malignant degeneration. In the case reported, by means of a wedge-shaped excision parallel with the long axis of the lip, the latter was reduced to normal size.

FURTHER EXPERIMENTAL DATA ON THE VASOMOTOR RELATIONS OF SHOCK

DR. M. G. SEELIG, of St. Louis, Missouri, stated that in a previous paper he had attacked the wide-spread doctrine that shock was due to exhaustion of the vasomotor centers, and consequent paralysis of the peripheral vascular system. He rested his case on definite experimental date to prove that the peripheral vascular system was not paralyzed.

The present paper was a continuation of the work already reported. The results of his experimental work pointed against the correctness of the theory that shock was a symptom-complex due to vasomotor exhaustion.

OSTEOMYELITIS

DR. JAMES E. MOORE, of Minneapolis, stated that inflammation of the bone was due to infection just as it was in any other tissue, the added symptoms and dangers being entirely due to the density of the structure. The virulence of bacteria was always enhanced by pressure and the denser the tissue the greater the danger of necrosis, because of the early interference with the circulation from the products of inflammation, and as soon as part of a bone became necrosed the sequestrum acted as

a foreign body. That the contusion of bone was the most common exciting cause of osteomyelitis was well established, but that underlying causes were back of that was evident, because all contusions of bone were not followed by infection, and many so-called idiopathic cases occurred with no history of contusion whatever.

The early treatment of acute osteomyelitis was just as much of a surgical emergency as the treatment of acute appendicitis. The diagnosis should be made early and followed promptly by operation. There was no medical treatment for this disease, and poultices and other local applications only led to waste of valuable time. There was but one form of treatment, and that was a free opening into the medulla. An incision through the periosteum might relieve some of the pain, but it was insufficient because it failed to stop the ravages of the disease. By a prompt opening into the center of the bone, drainage was established and the life threatening poison allowed to escape. An efficient opening relieved the pressure, and when made early enough would stop the separation of the periosteum and destruction of the endosteum, thus preventing or limiting necrosis. In a very early operation no pus might be found, but the medulla was greatly congested and protruded into the wound. Under these conditions the trephine opening need not be enlarged.

Chronic osteomyelitis might be the result of an acute attack or might be subacute from the first, when it was very liable to be mistaken for tuberculosis. In those cases following an acute attack an operation should be performed for the removal of the sequestrum as soon as it was separated, which was anywhere from six weeks to four months. The cavity should be thoroughly curetted, washed, and finally disinfected by heat or ninety-five per cent carbolic, the latter being much more convenient, and in his experience eminently satisfactory. The acid should be left in the cavity for three or five minutes, when it should be wiped out and the cavity thoroughly washed with alcohol, after which it should be dried and filled with Moorhof's bone wax in a liquid state. The wax quickly hardened at the temperature of the body, after which the periosteum and soft parts were closed in layers by means of chromicized catgut. A dry surgical dressing should then be applied, the bandage being quite snug, and finally the tourniquet should be removed. His experience with the bone wax was such that he could conscientiously recommend it, for when he had temporarily failed he was confident that the fault was in his technique and not in the method.

CASE OF EXTRAUTERINE PREGNANCY WITH TWINS, COMPLICATED WITH OVARIAN FIBROID ON THE OPPOSITE SIDE

Dr. D. W. Basham, of Wichita, Kansas, reviewed the literature on this subject, and reported a case.

A DECEPTIVE FORM OF APPENDICITIS IN WOMEN

Dr. H. S. Crossen, of St. Louis, Missouri, reported two cases, giving the clinical characteristics, the conditions found at operation, the treatment employed, and the final result.

The points of special interest were as follows: (1) The location of the mass in the tubo-ovarian region instead of in the appendix region. In the first case, palpation about McBurney's point showed no trouble there, and in the second case simply the edge of the mass extended to the appendix region. (2) The scarcity of inflammatory symptoms. Each patient was sick several months and quite a mass had formed before any acute symptoms appeared, and when they did appear they were comparatively mild. So marked was this feature that the mass, in connection with the history, gave the impression of a new growth, and it was with that diagnosis that each patient came under my care. This is accounted for in a measure by the extreme chronicity of the inflammation and also by its inclusion in the cæcal wall, as explained in the next paragraph. (3) The apparent intracæcal character of the mass. This was a striking feature and was due to the folding of the cæcal wall about the chronically inflamed appendix. Because of the special relation of the appendix to the cæcum or because of the chronicity of the low grade inflammation, or both, the infiltration and adhesions affected principally the wall of the cæcum adjacent to the appendix. The affected appendix was buried in the overlapped cæcal wall. This is what gave the feel of a mass within the cæcum and affecting its wall, and it was this also which made it so difficult to locate and expose the appendix. This peculiarity is important from the standpoint of treatment, for, unless carefully investigated, such a condition might be treated by extirpation of the cæcum under the mistaken supposition that the mass was intracæcal and malignant or tubercular. This peculiarity helped to account, also, for the dislocation of the mass. As the cæcum with its mass was fairly movable it naturally dropped downward into the tubo-ovarian region. Later, adhesions formed, fixing it in the abnormal location. (4) The slow absorption of the infiltration in the cæcal wall, after removal of the affected appendix. In the first case, absorption of the infiltration in the

wall of the cæcum required nearly a year. In the second case in which pus was found the absorption of the infiltration was more quickly accomplished, requiring only about five months. Fortunately in both women the abdominal wall was thin and permitted of deep palpation; consequently the diminution of the cæcal induration could be accurately followed. The fact that the condition described was likely to lead to mistakes, was illustrated by the following incidents: In an eastern museum a specimen labeled "Absence of the Appendix" showed on dissection the condition mentioned above, i. e., an overlapped cæcal wall enfolding the inflamed appendix. Again, in a case related to me, a cæcum resected for supposed malignant disease, with fatal result, revealed on subsequent examination the condition above described, i. e., the supposed tumor consisted simply of the inflamed appendix surrounded and completely hidden by the cæcal wall.

THE ABUSE OF HYPODERMIC STIMULATION DURING AND AFTER SURGICAL OPERATIONS

Dr. Horace G. Wetherill, of Denver, Colorado, said the best results and the lowest mortality of the busiest surgeons of to-day were attained by the simplest methods. Careful diagnosis and accurate estimate of the ability of the patient to undergo the operation was made. He was prepared with great care, the anæsthetic was wisely chosen and skillfully given, he was operated upon without avoidable exposure, delays, or hæmorrhage, he was returned to a warm bed, placed in a favorable position, watched by a competent nurse, and let alone. If he was restless and really suffering from shock or severe pain as he emerged from the anæsthetic he might be given a moderate dose of morphine or atropine but, notwithstanding its stimulating and soothing effect, he was ordinarily better off if it could be omitted.

By such methods based upon such reasoning and experimental proof, the greatest surgeons of the century were securing the best results and the lowest mortality ever recorded in surgical literature

DISCUSSION

In the discussion on this paper, which was participated in by Drs. Chas. H. Mayo, Leonard Freeman, and Arthur E. Benjamin, it was pointed out very clearly and strongly emphasized that surgeons in recent years had been gradually letting up on stimulating their patients during the time of operation and afterwards, unless absolutely demanded. A great many hypodermic injections were given patients before or after operation with more harm than good.

SURGICAL TREATMENT OF HYPERTHYROIDISM

Dr. W. D. Haines, of Cincinnati, Ohio, after reviewing the literature, embryology, and anatomy of the thyroid gland, presented evidence to show that the syndrome called goiter was due to overactivity of the adrenals induced primarily by an excess of thyroglobulin in the blood. Discrepancies of opinion in the past were due to a lack of definite knowledge of the actual changes which took place in the gland at the time of observation. Laboratory study had shown a local hyperæmia with increase in colloid and diminished staining reaction, but no gross changes in the gland in the first stage. This was followed by hyperplasia, or the second stage. Imperfect alveoli lined with giant cells and great loss in colloid characterized the third stage, while fibrosis, cell atrophy, sclerotic arterial walls, hæmorrhage, and cyst formation completed the final steps in the destructive process. Basing treatment upon these findings, he advised diminishing the blood supply by ligating two or more of the thyroid arteries in preference to thyroidectomy in the management of cases of hyperthyroidism, with moderately enlarged gland and active symptoms. Ligation was a lighter operation and was not followed by hyperthyroidism. In the operation for the removal of adenoma, or partial thyroidectomy, he kept within the thyroid capsule, thus avoiding injury to the parathyroids and recurrent laryngeals.

INTRATHORACIC GOITER WITH REPORT OF CASES

Dr. C. H. Mayo, of Rochester, Minnesota, said the transposition of the thymus and lower poles of the thyroid when forming possibly acted as one of the causes of intrathoracic substernal goiter. These growths usually consisted of diffuse colloid or encapsulated adenoma, and when they were completely detached from the thyroid they were wandering. Most of the symptoms occurred from pressure upon the circulation, the trachea, nerves, or the œsophagus. These tumors were usually associated with an ordinary goiter, and probably one-half of them were discovered through complications arising during a thyroidectomy. As they were often enucleated with great difficulty, their removal might be followed by severe hæmorrhage. Intrathoracic pressure obliterated the space; therefore, drainage should be brief. Twelve cases were reported, six being of the diffuse adenoma, six of the encapsulated variety, with one death from collapse of the trachea, due to a hypertrophied thymus of fifty-six grams in a patient with severe hyperthyroidism.

SCOPOLAMINE AND MORPHINE AS A PRELIMINARY TO GENERAL ANÆSTHESIA. A REPORT BASED ON AN EXPERIENCE OF ELEVEN HUNDRED CASES

DR. CLIFFORD U. COLLINS, of Peoria, Illinois, stated that many erroneous statements had been made in the literature concerning the use of this combination as a preliminary to general anæsthesia, and he quoted some of them which his experience seemed to disprove. He used a tablet containing scopolamine 1-100 grain, and morphine 1-6 grain. A solution was made and the combination injected hypodermically one and one-half hours before the operation. The preliminary was given to all adult patients and all children above the age of eight years. No contraindications had been found for the combination. Its action was beneficial as a preliminary to nitrous-oxide gas as well as ether and chloroform, and other general anæsthetics. Only one patient in the eleven hundred showed dangerous symptoms, and these were soon relieved. His experience seemed to show that scopolamine and morphine as a preliminary to general anæsthesia was a rational procedure, adding greatly to the comfort of the patient by relieving him of all nervous apprehension prior to the administration of the general anæsthetic, by permitting him to sleep for some hours after the operation, and by greatly decreasing the amount of post-operative vomiting; and mitigating the dangers of the general anæsthetic by lessening the amount necessary to produce the desired effect, and by checking the secretion of mucus in the throat.

The following papers were also read: "Duodenal Obstruction with Uncontrollable Vomiting and Surgical Method of Treating It," by Dr. Arnold Schwyzer, St. Paul, Minnesota; "Specimen Showing Pericolonic Membrane" was exhibited by Dr. Howard Hill, Kansas City, Missouri, for Dr. Jabez N. Jackson; "Rhinoplasty with the Aid of a Finger and of Skin from the Chest," by Dr. Harry M. Sherman, San Francisco; "Poliomyelitis, Cause and Best Treatment to Prevent Deformity," by Dr. J. W. Cokenower, Des Moines, Iowa; "Report of a Spinal Cord Tumor," by Dr. William Jepson, Sioux City, Iowa; "Our Present Knowledge of the Pathology of Goiter and Some of the Sequelæ of Its Removal," by Dr. Alanson M. Pond, Dubuque, Iowa.

OFFICERS

The following officers were elected for the ensuing year:

President, Dr. John P. Lord, Omaha, Nebraska.

First Vice-President, Dr. Harry M. Sherman, San Francisco.

Second Vice-President, Dr. L. L. McArthur, Chicago, Illinois.

Secretary-Treasurer, Dr. Arthur T. Mann, Minneapolis, Minnesota.

Chicago, Illinois, was selected as the place for holding the next annual meeting.

CHICAGO SURGICAL SOCIETY

REGULAR MEETING HELD JANUARY 7, 1910, WITH THE PRESIDENT, DR. ARTHUR DEAN BEVAN, IN THE CHAIR

FRACTURE DISLOCATION OF THE ELBOW

PRESENTATION OF THE PATIENT

BY WILLIAM HESSERT, M. D.

I desire to briefly demonstrate a case which illustrates plastic work on the elbow joint, and all those that have done that kind of work know what difficulties are encountered in these old cases of neglected fracture dislocations of the elbow.

The history of this case is as follows: The boy received a fracture dislocation of the left elbow four months ago. When he first came under my care, three months ago, his left elbow was almost completely ankylosed in the extended position. There was very little motion. The X-ray showed the results of the old fracture dislocation; the radius and ulna being displaced backwards. The lower end of the humerus showed the result of irregular displacement of many fragments, and taking it altogether it was a bad looking joint. To attempt subcutaneous manipulation in a case of this kind with a view of breaking up the joint and securing motion was out of the question. It is impossible to tell what ligaments and structures are going to be torn, and one would substitute severe traumatism at another angle for what was already present. I decided on the open operation which was performed as follows: The first incision was made on the outer side of the arm, penetrating through the muscular septum down to the joint. The same was done on the inner side and the joint reached in this manner. Externally and internally the lateral ligaments were severed and the capsule also so far as necessary. With the chisel I separated the bony adhesions so that I could get some motion. Even after everything was loosened up, it was impossible to move the arm more than a few degrees of a circle. I dislocated the end of the humerus out of the wound and removed the articular surface, being conscious, of course, that the epiphyseal line should not be disturbed. I trimmed off and rounded the end of the humerus and when that was done the arm was freely movable, flexible and could be extended. A flap consisting of fascia, with a little bit of underlying muscle, was taken off the outer aspect of the arm with the base downward. The flap was inserted between the ends of the bones and brought out on the inner side and securely fastened with catgut sutures. The fascial flap then made a covering for the denuded end of the humerus. When the operation was completed there was scarcely any lateral mobility and it was possible to move and flex the arm and extend it without any sensation of crepitus. The arm moved as freely as did the arm on the opposite side. It healed nicely and after ten days the after treatment was instituted. Drains were removed after four or five days. After having secured primary union, which, of course, is absolutely essential to the success of the operation, probably the most important part of the procedure is the after treatment, and I believe that to be the persistent use of passive motion. If an elbow of that kind was immobilized at any angle, I am sure even if a fascial flap had been inserted one would probably get ankylosis again, so that I believe our success in these arthroplastic operations on joints is largely dependent on the constant use of passive motion after operation. This was done after ten days and kept up with the aid of the boy, who was plucky about it, so that now, after three months, we can exhibit the result that you see. Flexion is almost complete. He can flex the arm as much as he can the one on the opposite side, and that is one of the most essential features in these cases, of which I have had three in the last year. To secure a good flexion it is more difficult than to secure complete extension which is not so essential as good flexion. Pronation and supination are quite free in this case and taken altogether I think the restored function is quite good.

DR. A. J. OCHSNER: How long after the injury was the operation done?

DR. HESSERT: The operation was done two months after injury.

DR. E. W. ANDREWS: I failed in operating on a case of this sort because in introducing the fascia I failed to do what Dr. Murphy has insisted on, namely, to include a thick layer of cellular adipose tissue. If the cellular adipose tissue is carried

along with the bony flap which we bring over the head of the bone, it produces a hygroma which strongly resembles synovial surface, which may be said to be like the serosa which moistens and secretes fluid. In all these joint cases it seems to me the technique should consist in making double rectangular flaps from the right and left sides, carried across and meeting in the middle. If this is done the flaps are better nourished and there is less danger of losing them by gangrene.

A CASE OF HYDROCEPHALUS TREATED BY CONTINUOUS DRAINAGE THROUGH A GLASS TUBE

This paper was read by DR. E. WYLLYS ANDREWS, and will appear in a later issue of SURGERY, GYNECOLOGY AND OBSTETRICS.

DISCUSSION

DR. ALLEN B. KANAVEL: I was very much interested in this case, because last June I attempted an operation upon a child, one year of age, with a congenital hydrocephalus, that was temporarily successful, but ultimately failed. Cushing has shown us the frequency of the communication between the internal and external cavities in these cases of congenital hydrocephalus, and I believe it was Payr who at one time, about two years ago, transplanted a vessel through the tissues of the brain into the internal cavities, with the idea of draining these cavities into the tissues around the skull. In this particular case I speak of there was one large vein running upon the side of the head of the child, which was sufficiently large to justify an attempt to suture it into the dura. The child was prepared and an incision made over this vessel at its bifurcation, at that point the two branches of the biturcation were split in the middle to make a large flap. The dural flap was turned down and through a perforation this vessel was thrust, the bifurcated portion being turned back and sutured with vaselin sutures. The dura was sutured in place. For ten days after this operation the child was much better apparently. I have forgotten the amount of decrease in the size of the skull, but it was considerable. I allowed the child to go home. At the end of a week, after going home, I was summoned, and on examination of the child found that infection had occurred along the line of the sutures. This apparently did not lead to a meningitis, but at the time I saw the child, two weeks and a half after the operation, the fluid had evidently re-accumulated, and the opening into the vein had been occluded, and about a week after that the child died.

I report the case because of its suggestiveness and the possibility of some variety of auto-transplantation of vessels in these cases. The vessel was quite small, and I question the advisability of using a superficial vein in that way. It may be possible to transplant a larger vessel in a child or one from the mother, brother or sister, and do something which might be of some avail in a case of this kind

DR. CARL BECK: In the same manner as Dr. Kanavel has mentioned I tried with Dr. Carrel four years before Payr published his article to transplant a vessel in a case of hydrocephalus. The child was a year and a half old. We transplanted a superficial vein of the head into the cavity; the child died. Some time afterward, however, I tried the experiment again, and this time I resected a larger vein — the jugular vein — and transplanted it, and the result for some time was gratifying, but after about six months there was again the same symptom-complex as before.

THE CONGENITAL ORIGIN OF THE SAC IN OBLIQUE INGUINAL HERNIA

This paper by DR. WILLIAM HESSERT, appears in this issue. (See p. 252.)

DISCUSSION

DR. F. GREGORY CONNELL, of Oshkosh, Wisconsin: I am very glad to have heard Dr. Hessert's paper, which reinforces me in my opinion that practically all oblique inguinal herniæ are of congenital origin. It is very evident that the nomenclature of hernia is undergoing a change. The term "congenital" hernia is being modified and to-day applied to different conditions from that which formerly was included under this classification. The division of inguinal herniæ into direct and indirect is misleading as the direct is merely a ventral hernia through the linea semilunaris that happens to pass through the external inguinal ring and into the scrotum, it should be considered as such, and radically different from the oblique or indirect hernia in etiology, in the results, and in the line of operative treatment necessary. On the other hand, confusion arises from the fact that very old, large, extensive oblique inguinal hernia, in which the internal ring is dilated way down to the pubic arch, the conditions are practically those of a direct inguinal hernia, regardless of the origin of the neck of the sac, either above or below the deep epigastric vessels. Such extensive indirect, and all direct inguinal herniæ are practically ventral hernia, and require plastic operative procedures radically different from the early oblique inguinal hernia. And it is in the surgical judgment exercised in recognizing and meeting the indications in each individual case that success or failure is accomplished.

Perhaps some of the most important reasons for accepting this so-called "saccular" theory, as advanced by Mr. Hamilton Russell of Melbourne are: that the so-called congenital type of hernial sac, that is, in which the tunica vaginalis communicates with the hernial sac, is not the most common type met with in infants and new born babes. The hernia found most frequently in infants is the same type of hernia found most frequently in adults. The congenital type of sac is present in only about ten or eleven per cent of all cases.

On the other hand it is frequently encountered in individuals who reach adult life. They suddenly develop a hernia, which may become strangulated and is operated upon at once. In such cases this preformed sac has been present ever since birth, yet the mode of origin is similar to the type of hernia which is called acquired. In many of these cases inquiry will give a history of hernia in infancy, which was either cured by the wearing of a truss or disappeared spontaneously. Failure to discover hernia in infancy is very frequent.

Another reason why we should believe in the saccular theory is that radical cure follows operations in which nothing is done but the simple removal of the sac, that is, completing nature's work, completing the obliteration of the vaginal process and replacing anatomical structures exactly as they would have been had nature completed the development of the child, as is found in those who do not have hernia. Before operation this relationship of the structures was not sufficient to prevent hernia; after operation the same relationship of the structures cures the hernia and prevents recurrence. The only difference is that in the second case, after operation, you have removed the sac and have obliterated the vaginal process, while in the other case before the development of the hernia it is possible and very probable that there was a preformed sac in the inguinal canal communicating with the parietal peritoneum.

Dr. William Fuller: As the essayist has said, and as Dr. Connell has also stated, the greater number of inguinal herniæ are probably due to a pre-existing or congenital sac, but as to the truth on this point, some doubt may be entertained. The gross anatomy at the operating table discloses nothing in hernial operations justifying a definite opinion on the origin or nature of the hernial sac. This is a fact known to most surgeons, and pointed out by Sachs over twenty years ago.

Bramann and Weil, as quoted by Schönholzer, have made it clear that nothing but microscopic study of a hernial sac will determine its origin. They have shown that the gubernaculum, instead of becoming a useless structure at the end of fœtal life, as has been the belief, becomes in fact a very definite structure. By a process of "inversion" they describe this muscular structure as contributing to the formation of the processus vaginalis, and to the cremaster as well. According to Bramann, then, the cord and testes are covered by tissues which have their origin in the gubernaculum Hunteri, and contain, therefore, muscular tissues, a fact demonstrable only when the hernial sac is of congenital origin.

The point, after all, is of small moment, for the possession of such knowledge could add nothing to the probabilities or likelihood of a permanent cure of the hernia, nor would it even facilitate the operation.

Dr. Arthur Dean Bevan: I think the conception that Dr. Hessert presented of the testicle drawing down the process of peritoneum in its development is erroneous, and it has been shown to be such. The true conception of the process of peritoneum is that it grows like a bud, or just like a tree grows when the limb bud of the lower extremity is thrown out. The mesoblast is thrown out in the lower extremity forming blood-vessels. The nerves grow into that bud.

In the same way in inguinal hernia and even in femoral hernia the process of peritoneum accompanies the vessels that pass down into the scrotum or into the limb bud, and a preformed sac is the result and is just as frequently the cause of femoral hernia as it is inguinal hernia.

Only yesterday I operated upon a boy with two congenital femoral hernias, in which it was quite evident they were distinctly congenital. Post-mortem examination has shown in a number of cases cross-sectioned these preformed sacs in the femoral and inguinal regions. I am quite of the opinion that the view which is taken by Russell and Dr. Hessert and others is correct, that the preformed sac is the most important factor in both femoral and inguinal hernias.

Dr. Hessert (closing the discussion): I believe Dr. Bevan was in error when he understood me to say that the testicle draws down the process of peritoneum. I recall an illustration of one of Russell's articles to show that there is a bud of peritoneum or a tendency of this membrane to follow along the blood-vessels in the inguinal region. The femoral and epigastric arteries with their branches form a sort of cross which roughly is the course taken by the commoner forms of femoral or oblique inguinal herniæ.

In regard to Dr. Fuller's statement as to the possibility of recognizing the sac, I think in the

majority of cases at operation one can form a pretty certain conclusion as to whether or not the sac is of congenital origin. By bearing in mind the different points mentioned in my paper, especially the occurrence of constrictions of this kind, and the coexistence of constrictions and sacculations and pockets and extra chambers, one can at once make a diagnosis that a certain sac is of congenital origin, not in all cases, but three-fourths of the cases. The frequency with which these are found, when you look for them, is astounding. In the majority of cases you will find something about the sac which will point to its being of congenital origin.

TUMOR OF THE CEREBELLUM

Presentation of the Patient

By WILLIAM R. CUBBINS, M. D.

The object in presenting this case is to emphasize some of the possibilities of improvement, but at the same time to enable us to make a prognosis that will at least carry some idea as to what may happen following operations of this kind. After the diagnosis of a cerebello-pontine angle tumor had been made by Dr. Julius Grinker a decompression operation was decided upon with the idea of removing the tumor should the condition of the patient warrant further procedure.

There was an almost complete loss of sight due to choked disc and an accompanying optic atrophy, some cerebellar ataxia, slight and irregular headaches, and only one or two slight attacks of vomiting, otherwise the patient was in fairly good condition.

During the operation considerable trouble was experienced with hæmorrhage from the bone, which was honeycombed with large sinuses, otherwise the operation was without event. The amount of bone removed is shown here in the skiagram. If you will look closely you will see that all of the occipital bone is removed below the superior curved line, from the right mastoid process over to within one inch of the left mastoid, including the posterior rim of the foramen magnum. When the dura was opened the cerebellum was forcibly extruded more markedly on the right than the left side. Patient's condition not being very good at this stage no attempt at removal of tumor was made.

The fascia was firmly closed and the skin over that. After recovering from the anæsthetic she showed marked mental confusion which continued for three or four months. The ataxia, which had been limited to the lower extremities, now involved the upper also, and there was also some external strabismus in the right eye. It was not possible to determine the amount of sight at this time as the mental confusion was so marked. Now, however, the mental condition has cleared up, and at present we have only to deal with a slightly more severe ataxia in both upper and lower extremities.

The eyesight which she had at the time of the operation is about the same, but the patient has learned how to use it better, and has little or no trouble in describing familiar objects. Unusual objects are also described more freely. There is some protrusion which contains a clear fluid, and at times there has been an escape of the cerebrospinal fluid. As a resume we can say that in order to save her eyesight we have caused her to be ataxic. The mental changes that are possible should also be forewarned against.

ABSTRACTS OF CURRENT LITERATURE

DEPARTMENT OF SURGERY

UNDER THE CHARGE OF

FREDERIC A. BESLEY, M. D. — WM. R. CUBBINS, M. D. — AIMÉ PAUL HEINECK, M. D.
WM. C. DANFORTH, M. D. — FREDERICK G. DYAS, M. D. — G. T. COURTENAY, M. D.
FRED C. ZAPFFE, M. D. — JAMES F. CHURCHILL, M. D. — B. J. O'NEILL, M. D.
ARTHUR B. EUSTACE, M. D. — JOHN A. WOLFER, M. D. — H. A. POTTS, M. D.

Compound Fractures of the Anterior Region of the Skull (Les fractures compliquées de la région antérieure du crâne). DR. L. THÉVENOT. *Archives générales de chirurgie*, September 25, 1909.

In discussing this subject and in reporting cases of this lesion, the author states that fractures of the anterior region of the skull are not infrequent and that many of them are compound fractures. These fractures are usually due to direct violence, and if the overlying tissues are not divided by the contusing body, they are often cut by the orbital ridges. The individual may have fallen upon his forehead, he may have been kicked by a horse, or struck with a club. These etiological factors explain why the fracture is rare in women and why it is more frequent in adults than in children.

In discussing the pathological anatomy, he says that in these cases the skull lesion may be a fissure, a comminuted fracture with or without depression. Fissures may be the only lesion present. Their length and their course are variable and depend upon the causative conditions. They may exist alone or be associated with near or distal greater disturbances of the frontal region. These greater disturbances may be fractures with or without depression of the fragments. Often the fragments are depressed by the trauma which has caused the fracture. Any portion of the frontal region can be the seat of fractures; the median region is the most frequent seat, at times, the region which corresponds to the frontal sinuses. The anterior wall of the frontal sinuses may have been injured, converting the sinuses into cavities containing blood and wound secretions.

A distinction must be made between fractures of the frontal sinus and fractures involving the entire thickness of the skull. These bony lesions are associated with lesions of the soft tissues, such as lacerations of the superior longitudinal sinus of the meninges of the cerebrum. The superior longitudinal sinus in this region is only of secondary importance. It is here poorly developed and the hæmorrhage determined by its rupture is not alarming. A clot is formed, the hæmorrhage is arrested, the walls of the sinus becoming adherent to each other for a greater or less distance, lead to its obliteration. In a few cases, blood accumulates between the dura mater and the brain, leading to the formation of subcranial hæmatoma. These are always of small volume and do not determine clinical manifestations. The dura mater is a resistant, fibrous membrane. It is easily detached from the overlying bone; this explains its integrity in many of these cases. However, cutting and sharp fragments may perforate or divide it. Such wounds of the dura mater are always limited in extent.

Lesions of the cerebral convolutions can exist with those of the dura mater. At times a contusion, a crushing of the cerebral substance takes place and a cerebral tissue mass mixed with blood escapes through the edges of the wound. Lesions of the cerebrum may exist and the meninges be intact.

The author is of the opinion that prognosis in these cases must be guarded. Other things being equal, fractures of the anterior region of the skull are the least serious of the cranial fractures. When nervous disturbances persist they are not very marked. They consist of apathy, somnolence, loss of memory, etc. The aim of the surgeons should be to prevent infection. In all cases where infection is suspected to have occurred even if the operator be dealing only with a fissured fracture, the margins of this fissure should be resected. Resection of the margins of the bone is the way to avoid the retention of wound secretions and the development of infections. All splinters of the internal table must be removed. In cases of comminuted fractures with or without displacements, intervention is imperative. The object of intervention is to avoid infection and to prevent the occurrence of cerebral compression. Though the brain is compressible, it is not so with impunity. Detached fragments of bone must be removed.

A subdural hæmatoma must be evacuated by incision of the dura. The author believes in early resection of hernia cerebri. AIMÉ PAUL HEINECK.

Operations in the Posterior Fossa of the Skull (Über Operationen in der Hinteren Schädelgrube). DR. B. BAISCH. *Beiträge zur Klinischen Chirurgie*, band 60.

Baisch reports three cases from the Heidelberg clinic, of which two were gliomas and one a cerebellar cyst. One of the gliomas should really be noted as a cysto-glioma.

As to the causation of cerebellar cysts Baisch gives the following classification:

1. Congenital anomalies. Diverticula of the fourth ventricle.
2. Accompanying solid tumors. Cysto-sarcoma, cysto-glioma.
3. Simple serous cysts.
4. Hæmorrhagic cysts (apoplexy).
5. Softening cysts (trauma, embolism).
6. Dermoid cysts.
7. Parasitic cysts (cysticercus).

The first three groups are by all means the most numerous.

Operative treatment offers a hopeful prognosis. Fourteen cases reported by Borchardt are quoted, of which thirteen recovered. A full restoration of damaged function may not always be attained, as in one of the cases reported by Baisch, in which an atrophy of the optic nerve was already present and the visual damage could not be corrected. In another case an unsteadiness in gait still remained after operation and some tendency to fall backward. In spite of this the patient's life was saved.

As to symptomatology Baisch finds headache, diminution of sight, cerebellar ataxia, choked disc, vomiting, and pressure pulse.

The incision used in the Heidelberg clinic had its base in the middle line of the back of the neck. The line of incision passed from the tip of the mastoid upward, curving inward to a point 2 cm. above the occipital protuberance and passing down on the opposite side. In this way bleeding from the sinus transversus and sinus longitudinalis may be avoided. An osteoplastic flap is recommended. The Gigli saw was used in the reported cases. The dura was opened in the form of a horseshoe flap. Baisch lays stress on the preservation of all possible brain substance.

Appended to the above report is a note of a case in which operation was done and nothing found. At autopsy two days later, atrophy of the right half of the pons, fresh hæmorrhage in the right pedunculus cerebri and in the subdural space, cerebral and cerebellar, were found. One further case is also mentioned which so improved after a Neisser-Pollock brain puncture, that no operation was made.

Of five cases, two were operated and recovered, two were operated and died, and one recovered to a sufficient degree under palliative measures that no operation was done. Cysts appear a better prognosis than other tumors. W. C. DANFORTH.

Hemostasis by Elastic Constriction of the Trunk (La Hermostasia por Constriccion Elastica del Tronco). DR. RAMON TORRES CASANOVAS. *Revista de Medicina y Cirujia*, October, 1909.

The author reports results of experiments on dogs, not having cared to attempt this method of hemostasis on human subjects.

The animals were anæsthetized with chloroform and a rubber tube applied about the body below the margin of the ribs until the femoral pulses were obliterated. Two turns of the tube were found sufficient. Compression was maintained 40 to 45 minutes. On removal the following facts were observed.

The animals regained consciousness with great rapidity accompanied by a marked acceleration of the pulse rate and fall in blood pressure. This was more pronounced when the pressure was suddenly removed.

A marked oliguria followed, in some cases the total amount of urine in the first 24 hours being only 1 cc. of concentrated urine; the amount gradually returned to normal in about four days and no abnormal constituents were found.

A paresis of the lower limbs followed, the dogs being uncertain and unsteady in their gait for several days, gradually returning to normal in five to ten days. The author believes that more or less permanent harm might follow in cases where there had been any previous affection of the legs.

In one case melena supervened after eight days and lasted two days: when it had ceased the animal was killed and autopsy showed a circular ulceration of the large bowel at the level of the constriction; as autopsies on numerous other cases failed to show any similar condition, and as there was a chronic inflammation of the large bowel in this case, the author concludes that the injury was due to the effect of the constriction on a previously altered tissue.

The author concludes that, while it may be harmless when the tissues are normal, this method of constriction may be fraught with grave dangers in cases of previously diseased tissues.

He adds that this method had been used by Dr. Ribera y Sans of Madrid for years before it was brought out by Momburg, and suggests that it should be called the Ribera-Momburg method rather than the Momburg method. B. J. O'NEILL.

A Practical Method of Obtaining the Duodenal Contents in Man. MAX EINHORN. *Medical Record*, 1910, lxxvii, 98.

Einhorn introduces a small rubber tube, on the end of which is attached a perforated metal bulb, into the stomach. Aspirates the stomach contents, then washes out the tube in situ and allows it to remain until peristaltic action carries it into the duodenum and even beyond. Its location can be determined by the measurements on the tube and by the X-ray.

C. G. GRULEE.

Etiology of Appendicitis (Zur Aetiologie der Appendicitis). MACLEAN. *Mitt. a. d. Grenzgeb. d. Med. u. Chir.*, vol. xxi, No. 1, p. 36.

MacLean claims that an extensive meat diet is the real cause of appendicitis and that obstipation and mucous colitis are not to be considered as etiologic factors in appendicitis because all three conditions are the results of the same cause -- excessive meat eating. They may occur independently of each other or concomitantly. It appears from MacLean's experience, as well as from previously recorded observations, that the simple life does not predispose to appendicitis and, in fact, people leading such a life are notably free from

this disease. He has become further convinced, as the result of observations made while stationed in China for four and one-half years, that appendicitis is really a disease of civilization. This is also true of constipation and mucous colitis, conditions with which vegetarians are never affected and which yield readily to a vegetable or meat-free diet. As further proof of his theory, MacLean cites the fact that nurslings almost never and young children rarely ever have appendicitis. Only the meat eating children have appendicitis. This theory would also explain the more frequent occurrence of appendicitis in men than in women; its appearance in certain families and certain districts.

FRED C. ZAPFFE.

The Value of Ascertaining the Coagulation-time of the Blood in Surgery (Die Verwertung der Koagulationsbestimmung des Blutes in der Chirurgie). DRS. WOLFGANG DENK AND I. HELLMAN. *Mitteilungen aus den Grenzgebieten der Medizin und Chirurgie*, vol. xx, No. 2.

In this article the methods of Hayem, Vierordt, and others are reviewed, the method of Wright and his technique which is used by the authors being given in detail.

The first series of 18 experiments are upon healthy individuals in order that an average normal coagulation-time may be arrived at; viz., about 2 minutes and 30 seconds.

The next 28 experiments are upon patients suffering from ordinary surgical diseases. The average in these is about the same — 2 minutes, 30 seconds.

In nine experiments upon patients suffering from surgical diseases which cause cachexia and marasmus, the coagulation-time was reduced to 2 minutes, or 2 minutes, 15 seconds.

Table iv gives the results of experiments upon 18 patients who habitually bled freely upon being wounded or suffered from severe nose-bleed, or bled very freely during an operation, all of these requiring a longer time to coagulate, even as long as 3 minutes, 20 seconds. Further experiments after the administration of calcium lactate show the coagulation-time reduced markedly, 40 seconds to 2 minutes, 20 seconds.

In 23 experiments after a milk diet had been given, the coagulation-time was greatly reduced but not so markedly as after the administration of calcium lactate.

Lastly are seven experiments after the administration of lemon juice. These show a constant increase in the coagulation-time as marked as was the decrease in time after the administration of calcium lactate.

The authors mention the work on serum therapy in memophilia by Lahli, Weil, Wright, and others, and point out that the administration of calcium lactate and calcium containing foods, expecially milk, will enhance the value of the serum therapy. Aside from this the authors point out the most practical results of the experiments as bearing upon thrombosis and embolism and refer to the work of Wright and Knopf regarding thrombosis in typhoid, which demonstrated an increase in calcium and increased tendency to coagulation. To avoid this tendency milk diet is dispensed with and lemon juice is given.

Résumé:

1. The Wright method and technique as described is the most accurate and applicable.

2. It is of practical value to the surgeon in diagnosing hemophilia.

3. In all bleeders, operations should be deferred if possible until a prophylactic course of serum or calcium has been given, during which the results of the treatment are controlled. All unnecessary operations should be abandoned when, after a course of prophylactic treatment, the coagulation-time remains higher than usual.

4. In the after treatment of all surgical cases having a normal or decreased coagulation-time, milk and foods hastening coagulation should be avoided. By increasing coagulation-time thrombosis and embolism are avoided, and this is done by the administration of lemon juice.

H. A. POTTS.

The Value of the Undescended Testis. JOHN BLAND-SUTTON. *The Practitioner*, 1910, lxxxiv.

Bland-Sutton calls attention to the fact that undescended testicles have never been proven to functionate except in the early years of young manhood, and he has never found spermatozoa in any removed by him. He advises removal where they interfere with an operation, e. g., herniotomy. He speaks of axial rotation and malignant growths. Of the latter he has been able to find fourteen specimens in the London pathological museums which he thinks is certainly proof of the predisposition of the undescended testicle to malignant growths.

C. G. GRULEE.

Acetone Alcohol in the Disinfection of the Operative Field. OTTO V. HERFF. *Centralblatt für Chirurgie*, December 25, 1909.

Dr. v. Herff objects to the usual method of skin closing (soap and water, alcohol, and some solution such as bichloride) on the ground that soap and water softens the skin and opens the glands, permitting the escape of bacteria, without allowing time for the removal or destruction of such bacteria. He considers alcohol our best disinfectant since it hardens and dries the skin and locks the deep lying bacteria in the glands. The action of the alcohol since it enters the deeper recesses, is continuous. The action of soap and water is thus antagonistic, and furthermore, dilutes the alcohol and diminishes its action. Some cleansing agent must then be substituted for soap and water. v. Herff considers that acetone is the best so far tried and finds that it is satisfactory, a good cleansing agent and that it aids the action of alcohol. He uses a solution of acetone alcohol $\overline{aa}$. It is especially useful in disinfection of hairy parts.

In addition to this, as a double precaution, the skin may be painted with an alcoholic or ethereal resinous solution. This further seals up the organisms. The following solution is recommended: Benzine and Resia Damar $\overline{aa}$ 10. Ether 100. Thymol 0.5. In place of the thymol 20 per cent of a solution of iodine (7), potassium iodide (5), and alcohol (100) may be used.

The technique is as follows: The dry shaved field

is well rubbed for five minutes, with acetone alcohol. The excess is sponged off and the wound area painted with the resinous solution. After the operation the area is sponged dry and again painted with the resinous solution. v. Herff has used this method since 1907. In over 280 cases there have been but two infections, both mild; superficial affairs.

Bacteriological work on this method of disinfection has been done by Oeri and Pfisterer (Zeit. f. Geburt. u. Gyn., 1908) and Von Heck (Inst. z. Erforschung der Infectious Krankheiten. Kalle, 1909).

J. F. CHURCHILL.

Surgery of the Heart (Contribution â la chirurgie du coeur). DR. SALOMONI. *Archives générales de chirurgie*, September 25, 1909.

Some time ago the author reported 134 cases of cardiac suture. He again discusses the subject and reports a few previously unpublished cases.

To get access to the cardiac wound, he opens the intercostal space at the side of the wound by enlarging the latter with scissors, and then disarticulates from the sternum the one or two costal adjacent cartilages. He believes that this intercostal route is the most rapid, the least mutilating, and the simplest of the various methods that have been suggested. If this incision fails to give sufficient room, it can be enlarged by means of a linear osteotomy of the sternum. This transversal resection, however, he recommends only for wounds of the base of the heart or of its right cavity.

There is some discussion as to the value of pericardial drainage. According to some clinicians, drainage of the pericardial cavity provokes infection of the pericardium, of the pleura, and the formation of pericardial adhesions. It is about the same discussion as that regarding peritoneal drainage with this difference, that the pericardial serosa absorbs less than the peritoneal serosa and that intrapericardial blood accumulations are only very slightly absorbed.

Out of fifty-eight cases of suture of the heart ending in recovery, drainage was employed in thirty cases. The cases of recovery in which drainage was used, proved simply that though drainage is not indispensable in all cases, it is useful in many.

Pericardial effusion is frequent after suture of heart wounds. It most frequently accumulates posterior to the heart. Pericardial effusion determines pericardial pain, anxiety, weakness; frequent pulse and cyanosis are late symptoms.

One hundred and fifty-eight cardiorrhaphies reported by 119 operators, give fifty-nine recoveries and ninety-nine deaths. Owing to simultaneous lesion of both cavities, to lesions of the motor centers and to valvular lesions, some of the cases were irremediably fatal. Injuries of the coronary arteries are usually fatal owing to infarct, aneurisms, degeneration of the heart muscles. The ligation of a branch of the coronary artery can be followed by recovery. The coronary arteries are not terminal arteries and therefore their ligation is not contraindicated. If the heart stops beating during the cardiac suture, slight massage may start it beating again.

To make a diagnosis of a cardiac wound, we have to take into consideration the seat of the wound, the symptoms of internal hæmorrhage, the increase of cardiac dullness and oppression, of pericardial anxiety, cyanosis, rapidity of pulse. In some cases instead of a cardiac wound, a wound of the lungs is discovered.

AIMÉ PAUL HEINECK.

Opsonins in Surgery (Klinischer Beitrag zu Wright's Lehre von den Opsoninen). ERHARD SCHMIDT. *Mitt. a. d. Grenzgeb. d. Med. u. Chir.*, vol. xxi, No. 1, p. 67.

A rather extensive series of experiments and observations, made by Schmidt, with reference to staphylococcus and tubercle bacillus infections, has convinced him that the determination of the opsonic index, as carried out at the present time, is of practically no value for therapeutic or diagnostic purposes, because it often falls short of showing actual conditions and its interpretation frequently yields questionable results. The methods in vogue at present are too complicated and too uncertain and open to too much question to make them of any or much clinical value. Furthermore, therapy cannot be employed successfully in the case of chronic inflammations, even when the index has not been determined. Therefore, too much reliance should not be placed on the determination of the opsonic index.

FRED C. ZAPFFE.

The Diagnosis and Treatment of Duodenal Ulcer. B. G. A. MOYNIHAN. *Proc. Roy. Soc. Med.*, 1910, iii, Surgical Section, 69.

In summing up the symptoms Moynihan brings out the following points. The onset is insidious with a vague feeling of discomfort in the epigastrium which comes usually at least two hours after eating. The pain comes on gradually and gradually increases, but is relieved by the ingestion of food; it may be referred to the back or to the right side. Acid eructations are frequent but vomiting is not frequent.

The attacks come on periodically and during the interval the subject feels perfectly well. Dilatation of the stomach comes late.

Moynihan says that "Recurrent severe hyperchlorhydria *is* duodenal ulcer." We rarely find an excess of acidity in the advanced cases. Hæmatemesis or melena occurred in 70 of 197 cases.

The treatment is always surgical, but it is difficult to determine when medical treatment should cease and surgical measures be resorted to. The following surgical procedures may be used: (1) excision of ulcer; (2) excision of a cylinder of duodenum and closure of the distal end, joining the pyloric end to the second portion of the duodenum; (3) partial resection; and (4) gastroenterostomy.

C. G. GRULEE.

ABSTRACTS OF CURRENT LITERATURE

DEPARTMENT OF OBSTETRICS

UNDER THE CHARGE OF

C. S. BACON, M. D. — RALPH WALDO LOBENSTINE, M. D.
HELIODOR SCHILLER, M. D. — C. G. GRULEE, M. D.

The Significance of Posture in Obstetrics. A. F. A. KING. *N. Y. Med. Jour.*, 1909, xc, 1054.

King states that thigh pressure should be regarded as a third force in labor. He believes that a squatting posture with the knees against the abdomen will often materially aid a protracted labor.

In cases of transverse presentation he advises that the woman kneel on the knee of the side to which the head is directed, and that the thigh of the opposite side be against the abdomen, the foot being flat on the floor in front of the patient. He has seen several cases in which this maneuver has apparently produced "spontaneous" version.

Where the head is in the lower segment and rotation is delayed, he advises that the woman kneel and then lean back on her heels. In the normal woman the heel will press in the sacrosciatic foramen and may bring about a rotation. Slight pressure over the sacrosciatic foramen in the cadaver will produce rotation of the head.

He feels that the obstetrician should give nature more chance to help herself, and states the above advised measures are harmless.

C. G. GRULEE.

The Morphology of Montgomery's Glands (Über das Verhalten der Montgomery Drüsen). NATOMSON AND GOLDSCHMIDT. *Monat. f. Geb. u. Gyn.*, b. xxx, h. i.

The opinions with regard to the morphology of the so-called glandulæ of Montgomery or tubercules of Montgomery, vary. Some believe them to be accessory mammary glands, some sebaceous glands, and some that they are a combination of sebaceous and accessory mammary glands.

In order to decide this open question, the authors examined a great number of areola and found that in the areola are, first, sebaceous glandulæ. They vary in number and size, are found in the cutis, subcutis, in the subcutaneous, connective, and fat tissue, sometimes reaching far down to the parenchyma of the mammary gland.

The sudoriferous glands present are for the most part small, but sometimes their coils are very large and contorted. They have a large lumen, especially during pregnancy, while the size of the sebaceous glands does not depend on the functionating period of the mammary gland

In the areola there is also, besides the normal lactiferous ducts, mammary tissue. There are,

1. Accessory mammary glands, which terminate in a duct in the areola.

2. Aberrant, lactiferous ducts which terminate in the areola.

The organs which have been called accessory mammary glands have been seen by the above authors only in functionating glands. They lie in the cutis, appear in lobules, have one excretory duct which often shows a lactiferous sinus, and an excretory duct terminating in the areola. This duct, as well as the accessory ducts, may terminate in communication with the duct of a sebaceous, a sweat gland, or a hair.

If we examine an areola with a magnifying glass, we see two kinds of tubercules. The tubercles of Morgagni, in man and woman, and the tubercles which are seen only in women and especially during pregnancy, the glands of Montgomery. The former contain only a sebaceous gland, probably a hair and a sweat gland. The latter vary as to their contents. They contain either accessory mammary glands, or a combination of them with a sebaceous or sudoriferous gland, or only an accessory lactiferous duct.

The authors claim that the glands of Montgomery are not a gland tissue per se. It is natural that accessory mammary glands, also that the sweat gland, will show proliferation during pregnancy, thus the protuberance becoming more distinct. In a number of cases the authors found the above described structures with a terminating duct, but no protuberance, the cutis perfectly flat. This peculiar condition was probably produced by tension in the skin.

The authors came to the conclusion that we should give up the name glandulæ of Montgomery and use in stead tubercules of Montgomery.

According to these findings, the presence of colostrum in the areola is easily explained, coming from the accessory mammary glands. Transitional stages of sudoriferous glandulæ into mammary glands as described by Eggeling, have not been seen by the authors.

HELIODOR SCHILLER.

A Case of Distocia Due to a Teratoma (Parto distocico deido a inclusion fetal). DR. J. PEDRAJA. *Siglo Medico*, 1909.

Dr. Pedraja reports the following case: Patient was a para ii of 26, of normal antecedents. Labor

took place at term and was normal until after delivery of head, when there was a delay of considerable length in delivery of the trunk, in spite of strong pains and good use of accessory muscles. The fœtus was dead and had an enormous abdomen. Autopsy showed this abdominal enlargement to be due to a tumor mass, 550 grams in weight, lying in front of the stomach and liver and attached to the junction of the stomach with the œsophagus. Section showed this mass to be a teratoma, containing cartilaginous bony, and muscular tissue, etc. B. J. O'NEILL.

Hæmorrhages from the Genital Organs in Hemophilia (Genitalblutungen bei Hæmophilie). FRAENKEL AND BÖHM. *Monats. Geb. u. Gyn.*, b. xxx, h. 4.

The general belief and the often-made statement that women do not have hemophilia, are incorrect. The author gives the histories of seven cases of hemophilia in women and was able to collect 151 more or less well described cases in the literature. We do not know the exact nature of the condition and therefore the definition can only be arbitrary.

A very copious menstrual hæmorrhage which lasts several weeks and resists all treatment, and which occurs in a person with apparently normal genital organs and with a family history of hemophilia, or at least with a tendency to copious or long lasting spontaneous hæmorrhages from other organs, must be called hemophiliac.

Case 1. A girl of fourteen with dangerously copious menstrual hæmorrhages. In the family are three members with symptoms of a hæmorrhagic diathesis.

Case 2. A girl of eighteen with a clear family history, has to be considered as a sporadic hemophiliac with a tendency to enormous menstrual and spontaneous hæmorrhages. Died during the sixth menstruation. This case proves the statement that hemophilia in women is always of bening nature to be incorrect.

Case 3. A simple case of hereditary hemophilia.

Case 4. A girl of 20. A case of sporadic congenital hemophilia with a tendency to spontaneous and traumatic hæmorrhages from the earliest childhood, and very severe menstrual hæmorrhages.

Case 5. A woman of 30. A case of sporadic hemophilia with spontaneous nasal, intestinal, and uterine hæmorrhages, aggravated after the first confinement.

Cases 6 and 7. Cases of sporadic congenital hemophilia.

Among the 151 collected cases were 99 of positive hereditary nature, 34 negative concerning heredity, 18 doubtful.

In 121 cases hæmorrhages of the genital organs occurred. Puberty begins between the tenth and fourteenth years. Twelve cases showed the first symptoms at the beginning of puberty; thirty cases had had hæmorrhages long before; nine cases menstruated normally; eighty cases menstruated too much and too often. The symptoms disappeared in many cases long before menopause, showing that menarche and menopause are independent of the disease. The menstrual hæmorrhage lasted from three to four days. In thirty-three cases it stopped after the use of heroic treatment only. In ten cases the patients died during menstruation, of acute anæmia.

Among 100 reported pregnancies and confinements are ten miscarriages with two deadly and five severe hæmorrhages. The first and second stage of labor are nearly free of hæmorrhages, not so the third; here are reported five deadly and fifty-six very severe hæmorrhages. Four cases had severe hæmorrhages on the 14th, one woman died in the 4th, one in the 8th week of hæmorrhages. Tendency to miscarriages does not exist.

If we compare the hemophilia in man, where 60 per cent of the sufferers reach the age of six and 11 per cent the age of twenty years, with the same disease in woman, we readily see that the course and prognosis in the latter is far milder and better. The ratio in women and men is given by some as 1:4, by others as 1:3. As a prophylactic measure, he demands strict prohibition of marriage.

The treatment of hæmorrhages of the genitalia in hæmophilia consists of firm packing of vagina and cervix with cotton. This might be saturated with adrenalin solution or gelatin or calcium chlorid. He advises also the subcutaneous use of styptica and serum; in desperate cases atmocausis, but he warns against currettement or extirpation of the uterus.

HELIODOR SCHILLER.

The Pathology of Eclampsia and Toxæmia of Pregnancy. J. E. WELCH. *Bulletin of the Lying-in Hospital of the City of New York*, 1909, vi, 12.

Welch reports the findings in 14 cases of eclampsia and four cases of toxæmia of pregnancy and comes to the following conclusions:

1. The liver lesions in eclampsia are not uniform. Pregnant or post-partum women dying from convulsions may have hæmorrhages, central necrosis, general autolysis, or cloudy swelling in the liver.

2. The liver lesions in toxæmia of pregnancy are not uniform. They may be either hæmorrhagic or central necroses, both of which are found in eclampsia.

3. The hæmorrhagic lesions are produced by liver and placental cell emboli, thrombi formed from blood plates and fused red blood cells and by a solution of vascular endothelium. Heightened blood pressure increases the extent of the hæmorrhages.

4. The agent producing the hæmolysis and general cell destruction is probably an enzyme.

C. G. GRULEE.

The Clinical Aspect of Placenta Prævia (Zur Klinik der Placenta Prævia). JULIUS RICHTER. *Wiener klinische Wochenschrift*, 1910, xxiii, 87.

After taking up the question of the treatment of placenta prævia as carried out in Schauta's clinic the article discusses the advisability of performing Cæsarean section in such cases. Of 11,107 labor cases at the Schauta clinic in the three years and ten months, from 1906 to 1909, there were 125 cases of placenta prævia. These are tabulated according to the location of the placenta, age of the fœtus, etc. In treatment version is preferred to the colpeurynter. For the performance of Cæsarean

section in placenta prævia to be advisable, according to Richter, three conditions must be excluded: first, the patient must not be exsanguinated; second, she must not have been examined outside the hospital; third, there must be a full-term living child. In no one of their 125 cases were these conditions all absent.

In conclusion he says: "Sectio Cæsarea classica is only indicated in placenta in those cases which are not exsanguinated, have not been examined outside the hospital, and the child is living and at full term, and with the express wish of the woman to save the child."

"In the large material at our clinic there was no single case which could have passed these indications, and we must say in the words of Schauta, 'Cæsarean section in our clinic even for the future will represent no lasting therapy.' " C. G. GRULEE.

Streptococcic Infection and Leucocytosis (Streptococcus Infection and Leucocytose). ZANGMEISTER. *Monats. f. Geb. and Gynaek.*, b. xxxi, h. 1.

The first conclusion which the author derived from a large series of blood counts was that the numeric fluctuations of the single leucocyte forms per cc. blood show the real condition of the patient, but not the numeric ratio of the variety of forms to each other. To make a prognosis in streptococcus infections from the blood picture it is important to know that conditions change completely after the first twenty-four hours after the infection and that the findings during the first twenty-four hours do not apply later on.

In monkeys he found the following after the first 24 hours after infection:

1. In infections rapidly fatal, all forms of leucocytes decline quickly in number.

2. In infections fatal after a few days, he found a tardy and small increase of the mononuclear neutrophilic cells and a decrease of the polynuclear neutrophilic and eosinophilic cells and lymphocytes in the first 18 hours.

3. In infections not fatal, he found an increase of the mononuclear neutrophilic cells during the first 6 hours after the infection; from then a decrease. The polynuclear and eosinophilic cells and lymphoctes increase in number after the first 6 hours.

Therefore good prognostic symptoms are:

a. An immediate increase of the mononuclear neutrophilic cells for the first 6 or 8 hours, with a following decline.

b. An increase of the polynuclear cells after 6 hours, after a short decline.

c. An increase of the eosinophilic cells inside the first 24 hours.

d. An increase of the lymphocytes in the first 24 hours.

The prognosis is bad (1) if the mononuclear cells show no increase or a decrease in the first 8 hours; (2) if there is a continuous decrease of the polynuclear cells and lymphocytes.

In a large series of the blood-countings before and immediately after operations the author found that these findings in monkeys are parallel to them in men.

After the first 24 hours conditions are changed, and the curve of the eosinophilic cells, of the lymphocytes, and of the mononuclear neutrophilic cells is of no importance. A continuous decrease of the polynuclear cells or their remaining stationary is a bad prognostic sign. In less severe infections they will rapidly or at least slowly increase.

His final conclusions are:

We are allowed to make a good prognosis inside the first 24 hours after the infection if we find (*a*) an immediate increase of the mononuclear neutrophilic cells with a slow decrease after 8 hours; (*b*) an increase of the polynuclear cells after 8 hours after a small decrease.

We have to deal with a fatal infection (*a*) if the mononuclear cells increase after the first 20 hours; (*b*) if the mononuclear cells do not increase at all or decrease immediately after infection; (*c*) if the polynuclear cells decrease constantly.

He made one blood count before, one 6 to 8 hours, and one 20 to 24 hours after the operation, respectively, after infection.

After 24 hours, the number of polynuclear cells only is of importance; if they are below normal and keep on decreasing the prognosis is bad, and vice versa.

By injecting a person with dead streptococci, Zangmeister was able to test the resisting power of the person against streptococcus infection — "Resisteur probe." If the resisting power is reduced the mononuclear cells after the injection will show no increase or the increase comes late; the polynuclear cells will show no increase soon after the infection, or a decrease.

HELIODOR SCHILLER.

Pyelitis in Pregnancy and Its Complications. F. E. SONDERN. *Bulletin of the Lying-in Hospital of the City of New York*, 1909, vi, 1.

Sondern bases his opinion on eighteen cases of pyelitis in pregnancy of which eleven gave symptoms of an initial cystitis and four of acute suppurative nephritis. All of his cases showed the bact. coli communis in the urine. He believes that these are cases of ascending infection. C. G. GRULEE.

Fig. 1

Fig. 2

Fig. 3

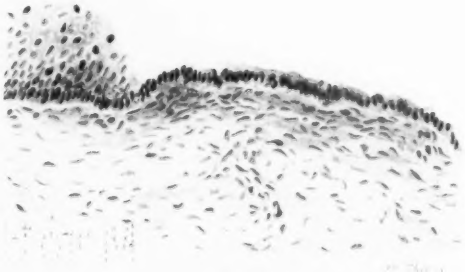


Fig. 4

Fig. 5

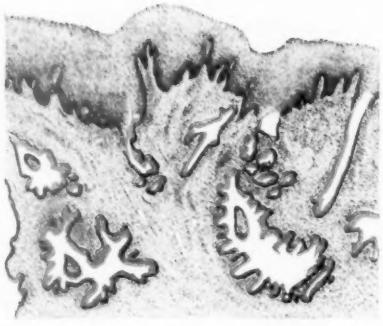


Fig. 6

Fig. 7